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THE MOUNTAIN STATE.

A DESCRIPTION OF THE NATURAL RESOURCES

OF

WEST VIRGINIA.

PREPARED FOR DISTRIBUTION AT THE

WORLD'S COLUMBIAN EXPOSITION

BY

GEO. W. SUMMERS, B. PH.

EDITOR OF THE CHARLESTON DAILY GAZETTE.

UNDER THE DIRECTION OF THE

BOARD OF WORLD'S FAIR MANAGERS FOR WEST VIRGINIA.

CHARLESTON, W. VA.
MOSES W. DONNALLY, PRINTER.
1893.

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INTRODUCTORY.

By an Act of the Legislature of West Virginia, approved March sixteenth, 1891, the Board of World's Fair Managers for West Virginia was created, and the Governor directed to appoint the members of the Board. On the seventh day of May, 1891, the gentlemen named on the preceding page were appointed. At their first meeting, held in Charleston, an organization was effected by the election of Hon. W. N. Chancellor, President; Hon. Geo. M. Bowers, Treasurer, and M. C. McKay, Secretary.

In June, 1892, contract was made by the Board with Geo. W. Summers to prepare, as a supplement to the State's exhibit at the Columbian Exposition, a work on the resources of West Virginia, and several months were spent by him in visiting the various counties of the State in search of the information desired to be contained in the work. Circumstances beyond the control of either the Board or Mr. Summers put a stop to the work and it was not till in March, 1893, after the publication of the book had been provided for by an additional appropriation by the Legislature, that a new contract was made and steps taken to complete the work.

In the main the work has been prepared from personal visits to every county in the State and from interviews with the leading and best informed citizens of each of the counties, and it may be relied upon as being as nearly accurate as any similar work extant. While some of the statements made concerning the resources of the State may seem extravagant, investigation will show that they are in the main correct. Every effort has been made not to over-estimate the value or extent of any resource, but to present for the in

formation and guidance of those who wish to know more of the magnificent commonwealth of the Alleghanies than they do, the facts as they are found, without any attempt at exaggeration. Believing that more injury could be done to the State by making erroneous claims which could not be substantiated, than by leaving unsaid a part of the truth, the aim has been to err in the latter way rather than in the former. Mistakes will undoubtedly be found, but the intent of the board and of the writer to present to those who seek it such information as will give them valuable knowledge of the State has never been lost sight of and the work is presented to the public with the hope and in the belief that it may draw to West Virginia more of the capital required to make her vast resources available, the labor that must go hand in hand with capital, the settlers who are to people our hills and valleys, the prosperity that must come, soon or late, to a State so endowed by kindly Nature as is West Virginia.

To those who have rendered their assistance in the preparation of the work, the writer desires hereby to tender his acknowledgements, knowing that without their generous aid he could not have prepared it.

WEST VIRGINIA.

West Virginia had an unfortunate start in life as a State. Born in the midst of that fearful civil strife which plunged the entire nation into a debt from which it has never yet recovered, which plucked in their prime so many thousands of the fairest flowers of all the land and saw them wither and decay, which plunged deep into debt and desolation the whole fair southern land, wrecking at once great fortunes and happy homes, bringing death and destruction and poverty over all the southern States and sadness over all, the early days of West Virginia were not conducive to the rapid advancement of the State. In the old State, that part west of the mountains had always been looked down on as more of a wilderness than anything else, and little attention was ever given to it. The people complained for years that they were permitted by the State to do nothing but pay their taxes. Their representation in the councils of the State was small, and by the "Old Dominion" that portion of her domain west of the mountains was practically ignored. Hampered and held down by the proud and powerful "Mother of Presidents," at the beginning of the civil war the part of Old Virginia which was afterwards set apart to form the new State gave but little promise of the glorious destiny that was in store for her. Her wealth was little known. The immense value of her timber forests, the almost inexhaustible deposits of her coal, the flowing wells of oil and gas, the richness of her iron ores, the great fertility of her hills and valleys were never dreamed of, and, aside from the desire to have the new State pay the old State debt, Virginia did not care for the loss, by separation, of her better half.

At first the new State's prospects were not bright. Along the border of the north and south, the sympathizers of both sides were numerous in the new State's bounds, and both sides felt most keenly the depressing results of the terrible civil war. The unhappy political situation, the poverty of the country, particularly of the people of this State, many of whom had lost their every dollar, the unsettled condition of the times in general, prevented at the first the development of any of the vast resources of the State. After the lapse of a few years, when the situation had been somewhat relieved, when the constitution had been altered and the liberties of the people much increased, when capital was coming in and the State was building up, then came the panic which brought again disaster through the Union and set the State of West Virginia back ten years.

The Centennial Exposition in 1876 brought prominently before the world the wonderful resources of the State and West Virginia took a fresh start. With its fine exhibit of the coals and irons and timber here to be found the State attracted capital from all parts of the world. The development of the State dates practically from that time. Soon after the State had shown to the world the vastness of her resources and had drawn the attention of the entire civilized world to her possessions, new mines were opened, new saw mills built, new people came in and settled among us, and railroad building took a start that brought the State up gradually to the front, till last year no other State in all the Union exceeded West Virginia in the amount of its railroad mileage completed within the year.

From practical oblivion, known only as the muddy, mountainous part cut off from old Virginia, our State has grown and still is growing until it now stands near the top among the list of States, and takes high rank among them all in the production of all those things to which her hills and vales are fitted. We have come out of the woods and in the place of the forests are springing up new towns. The State is not yet fully explored, the real extent of all her vast resources is hardly known, each new year adding some new discovery of value to the State; but step by step the forest fastnesses are being penetrated, the homes of man replace the haunts of beasts of prey and every part of the State is being brought in

touch with the busy life of the outside world. In 1863 a single line of railroad passed through a few of the northern counties of the State. To-day there are but 11 out of the 54 that have no railroad, and from the present prospects, within the next few years the iron arteries of trade will pierce the confines of them all and not a county in the State will be without its railroad and the industries that always accompany and follow the building of a road. In 1863 a few small coal mines produced a little coal principally for domestic consumption, and some was used for the manufacture of "cannel coal oil," but the coal trade so far as the shipment of coal to other markets than our own was concerned was almost unknown. In 1870 the coal production was but 608,878 tons. Last year two hundred mines were in operation, employing over 15,000 men and producing nearly nine million tons of coal in addition to the small mines for local consumption which still exist in the State as they did at that day. The timber then was only cut to get it out of the way of the farmer who wished to improve his land, and was burned or deadened and allowed to decay. To-day the timbering and lumbering industries of the State employ some fifteen thousand men, saw mills are in operation in every county of the State and the lumber produced from the West Virginia forests is shipped to every country in the world. The oil production of the State is next to that of Pennsylvania now, while thirty years ago the only oil produced was that which was extracted from the cannel coal. To-day the Sistersville oil field is the largest oil field in the world or rather the oil field producing the largest amount of oil. In 1863 no coke was made in West Virginia. Last year there were 1,314,449 tons of coke made in the State. In every way the State is rapidly forging forward toward the front. The population is rapidly increasing, the increase for the last decade being about 19 per cent. The capital invested is many times that of a few years ago. Development is bringing to the markets of the world the hidden riches Providence has bestowed upon the Mountain State. Manufacturing is growing in extent and variety and we stand upon the threshhold of a new era of prosperity, which will cause the State to grow in people and in wealth, in the variety of its products and in all that goes to make a State great and prosperous.

The abundance of opportunity and the absence of capital for the

proper development of the State invite the attention of all who are in a position to aid in bringing West Virginia to the front and at the same time to reap a share of the prosperity that is surely coming to the State. The possibilities for West Virginia are not exceeded by those of any other State in the Union, and to the attention of those who will aid in its development these possibilities are in this volume called.

COAL.

It is a difficult matter to convey to the mind of one not familiar with the facts any adequate idea of the immensity and value of the West Virginia coal fields. To say that sixteen thousand out of the twenty-four thousand square miles of the territory in the State is underlaid with coal, gives but a vague idea of what there really is. To say that over ten million acres of West Virginia is coal land, on which there is an average thickness of ten feet of coal, means but little more. When we say that there is a sufficient quantity of coal hidden away in the hills and beneath the surface of the State to supply the wants of the entire world for centuries to come, then does the mind begin to realize the real extent of the coal deposits of the State. Going further and estimating the amount of the coal in the State at the usual average rate of production, the ten million acres would yield one hundred billion tons. The coal production in this State for 1892, the greatest for any year in the history of the State, was something over eight million tons. Increasing this to an average rate of ten million tons a year, the coal of West Virginia, constantly mined, would last ten thousand years. The entire amount of bituminous coal consumed in the United States during the year 1889, according to the last census, was a little over ninety-five million tons. Increasing this to one hundred million tons a year, the coal in West Virginia alone would supply the entire United States with all its coal for the next one thousand years. If all the coal in West Virginia were, by some miraculous means, mined at once and loaded into railroad cars of twenty tons capacity, the whole would make a continuous train that would reach one thousand five hundred times

around the earth. According to the last United States census, the average value of the coal of the United States, on cars at the mine, was 99 cents a ton. At this rate the value of the coal of West Virginia, still unmined, would be ninety-nine thousand million dollars, enough to make ninety-nine thousand millionaires in the State of West Virginia. When the facts are looked at in this light, and the value of the hidden deposits of coal within the State are made apparent in such a way that they can be appreciated, there seems little room to doubt the statement made by Professor I. C. White, one of the best authorities in the country on geological matters, that the coal alone of West Virginia is worth more than all the gold and silver of the Pacific coast. Of the fifty-four counties in the State, there are but three—Jefferson, Hardy and Monroe—in which no coal has yet been found. Every other county in the State contains coal of some kind in varying quantities, most of them having an abundance. All kinds are found—anthracite, splint, bituminous, cannel and all the intermediate varieties—in some places all of them except the anthracite being found in the same counties and frequently on the same property. The veins range in thickness from a few inches to nearly thirty feet, and frequently the veins are found on the same property one above the other until the entire thickness of the combined veins aggregates very many feet. In one mountain in the State there are no less than eleven veins, one above the other, from 2 feet 7 inches to 20 feet in thickness, aggregating 68 feet 11 inches of coal. Aggregate thicknesses of from 25 to 50 feet of coal over the same property are not infrequent.

The following brief description of

WEST VIRGINIA COAL FIELDS

is taken from an article written recently by Prof. White for the Kanawha Gazette:

To the largest and most valuable coal field in the world, geologists have given the name Appalachian. It covers an area of nearly 60,000 square miles, and beginning near the northern line of Pennsylvania extends southward across that State, and taking in nearly the whole of West Virginia, and a broad strip from the southern part of Ohio, passes on through eastern Kentucky and Tennessee to end in Alabama, nearly 900 miles from its northern

terminus. The shape of this great field is roughly that of a canoe, and West Virginia lies within the zone of its broadest and richest portion.

In only four of the fifty-four counties in West Virginia is it impossible to find bituminous coal, viz: Jefferson, Berkeley, Morgan, and Monroe.

The column of rocks which holds the coal beds in the Appalachian field has been subdivided into several groups, and as these come to the surface in different portions of the State, and contain coals of distinctly different qualities, I shall briefly describe each, and trace the lines of their outcrops across the State.

At the base of the series, and therefore the lowest group of the true coal measure rocks, we have what is usually termed the conglomerate measures; because the great sandstones which are there interstratified with the beds of coal and slate often contain pebbles of quartz and other hard rocks in great abundance. The group has also received several other names, among which may be mentioned No. 12 conglomerate, Pottsville conglomerate, seral conglomerate and the millstone grit of the English geologists. The group of coal beds which these rocks contain have been termed the New River coal series, from that region of our own State where the beds, as a whole, have their grandest development.

The sandstones of this series are noted for their hardness and consequent power to resist the action of the elements. Being composed almost entirely of quartz pebbles and sand grains, they form great sheets of protecting rock which is almost indestructible by atmospheric influence, and thus it happens that this group of beds is the principal factor in forming the picturesque scenery of our Mountain State. The wild gorges and canyons of the Cheat, the Gauley, the New, the Guyandotte, the Big Sandy and other West Virginia rivers are all formed by this series of rocks. All of the ridges and peaks of the Alleghanies are capped and protected by this friendly mantle. Wherever these rocks come to the surface, wildness, barren soils, and precipitous slopes prevail, but when they dip below the drainage levels the mountains disappear, and in their stead we find rounded hills, with gentler slopes and broader valleys.

Another peculiarity of this series is that although it forms a continous sheet of beds under all of the 60,000 square miles of the Ap-

palachian coal field, yet it contains coal in workable thickness and purity only around the borders of the field in a comparatively narrow rim. Thus while there are valuable coal beds in Jackson county, Ohio, along the northwestern border of the group, and also opposite this along the southeastern border, in Fayette county, West Virginia, no workable coal would be found, if a shaft shoul l be sunk to the series, say at the mouth of the Great Kanawha, or at any other point 20 to 30 miles distant from the respective borders of the field. The same hard sandstones and pebble-beds would be encountered, but they would hold only thin streaks of coal and bituminous slates.

Another feature of these conglomerate coal measures is the great purity of the coal beds when they attain workable dimensions. These early formed coals are singularly free from injurious quantities of sulphur and ash, the bane of some coals. Their purity in this respect is probably due to the fact that just previous to the spread of the great peat swamps of this early epoch, the floor of the entire Appalachian coal field was sheeted with a deposit of clean sand and gravel, thus effectually covering up the muddy sediments of a previous epoch, and causing the streams which drained into the peat or coal marshes of the time to be clear and free from impurities, like our own mountain brooks of the present; but however this may be, the fact remains that these conglomerate coals are of exceptional purity.

Another strange thing about these coals is that along the northwestern border of the Appalachian field, the quality of the coal is entirely different from that found on the opposite, or southeastern rim of the field. Along the former, through Pennsylvania and Ohio, these coals are nearly always non-coking and can frequently be used in furnaces just as they are brought from the mines, and are hence often called "block" coals; but on the southeastern side, through West Virginia, Virginia, Kentucky, &c., the coals of this series are universally of the coking kind, and being so pure they are fast becoming justly celebrated for the production of coke of the highest grade.

The conglomerate rocks crop out on the surface in West Virginia through the following counties, beginning at the north: Preston, Mineral, Grant, Tucker, Randolph, Webster, Pocahontas, Greenbrier,

Nicholas, Fayette, Raleigh, Summers, Mercer, Wyoming, McDowell and Logan.

Until we get southward as far as Nicholas and Webster, there appears to be but one workable bed of coal in these conglomerate measures, and it lies near the bottom of the series. I have observed it at several localities, however, in Preston, Tucker and Randolph, in each of which the bed is about three feet thick, and very fair coking coal But on southward through Webster and Nicholas, into Fayette, the whole group of rocks increases in thickness very fast, and when we come to the New River, in Fayette county, these rocks have a thickness of 1,400 feet, and contain three workable coal beds, with thicknesses of three to five feet. It is from these beds that the famous New River coke is manufactured, which now sells in the market at a higher figure than the Connellsville product.

But although Webster, Nicholas, Greenbrier, Fayette and Summers all have splendid fields of these purest of coals, yet it is not, however, till we come to Raleigh, Mercer, Wyoming and McDowell counties, at the extreme southwestern corner of the State, that we find the thickest and most productive coal beds in this series of rocks; for here the great Pocahontas bed attains a thickness of six to ten feet over an area of several hundred square miles, while at many localities two other beds may be found above the Pocahontas vein, with a thickness of four to six feet.

The proximity of this great field of pure coking coals to the immense iron ore deposits of the South, renders it valuable beyond computation, and yet its development has only just begun. It is only about six years since the first car load of coal was shipped from the Pocahontas region, near the line of Mercer county, and yet during the past year, one million tons of coal and coke have gone to market from this region alone.

Lying on top of the conglomerate, or New River coal measures, we find another group of rocks with valuable coal beds included, and to this series has been given the name of Lower coal measures. To this group belong the coal beds which have recently attracted so much attention and capital to Clearfield, Jefferson and Cambria counties, Pennsylvania. Within the limits of these measures there are usually five coal beds which at one time or another furnish valuable fuel, viz: in descending order: Upper Freeport, Lower

Freeport, Upper Kittanning, Middle Kittanning, Lower Kittanning and Clarion Coal beds.

This coal series enters West Virginia from Pennsylvania in Monongalia and Preston counties, with a thickness of 250 to 300 feet, and contains two valuable coal beds, the Upper Freeport and the Lower Kittanning, the former being locally known as the "Austin coking" coal, and the latter as the "Newburg shaft" seam, on the Baltimore & Ohio Railroad. These two beds are separated by an interval of shales and sandstones 100 to 180 feet thick, and they are both easily accessible over a very large area in Monongalia and Preston. They have an average thickness of five to six feet each, and both make splendid coke. The same two beds reappear on the North Potomac, where they underlie an immense area along the West Virginia Central Railroad, in Mineral, Tucker and Grant counties. They are both mined near Davis, the upper one being called the "Thomas seam," and the lower one the "Davis seam." Both have been successfully tested for coke in the Davis region.

On southward from the counties already mentioned, the outcrop of this series may be traced through Taylor, Barbour, Randolph (where the U Freeport is the celebrated "22-foot seam"), Upshur, Braxton, Webster, Nicholas, Clay, Kanawha, Fayette, Raleigh, Wyoming, Boone, Logan, Lincoln, Wayne and Cabell. These are the counties along the eastern side of the Appalachian field, where the coals of this series come up to the surface, while on the opposite side of the fields the only locality where they come up to daylight is in Hancock county, and for a short distance along the Volcano uplift in Wood and Wirt. The series, however, underlies all the other counties of the State, which lie west from the belt first mentioned, and unlike the conglomerate series below, seems to have valuable coal beds in it at every locality. This we learn from the records of drill holes which have been made in nearly every part of the State.

One of these beds is now mined at Wellsburg by a shaft 200 feet deep, and the drill shows that the same valuable bed underlies Wheeling at a depth of only 500 feet, while at Parkersburg a good bed of coal seven feet thick and belonging to this same series was passed at a depth of 1,100 feet, and the same bed has been drilled through at Mannington, 1,300 feet below the valleys. These depths may be regarded by some as rendering the coal beds in question en-

tirely valueless, but such should remember that the development of this country has only just begun, and that England raises nearly all her immense output of coal from depths of 1,000 to 3,000 feet. These facts are mentioned simply to show the vastness of our resources in coal, and the permanency of supply of this "main-spring of civilization," and hence that the railroads, cities and manufactories which may be built within our borders, can depend on an abundant supply of fuel for many centuries, even from the beds of coal which can be operated from the surface; but when these shall have been exhausted, we shall still have an infinite wealth of these "black diamonds," which can be easily obtained by going down a few hundred feet below the surface. When that time comes West Virginia will possess a monopoly of coal in the Appalachian field, for it will be practically exhausted from all the States around us before that from our easily accessible beds is used up.

In passing from the northern part of the State south-westward to the region of the Great Kanawha, the lower coal measures expand wonderfully in thickness, and instead of a rock series of 250 or 300 feet as in Preston and Monongalia, we get 1,000 feet of rock between the uppermost coal bed of the group and the top of the conglomerate series below. Accompanying this expansion of the measures there is a great change in the character of the coal in the different beds. Instead of soft coking coal, we find cannel (in Wayne, Lincoln and Boone, the Upper Freeport coal forms one of the largest areas of pure cannel known in any country of the world) and "block" and "splint," which being quite hard, and crumbling with difficulty, make splendid shipping coals, and the perfection of domestic fuel. The lowest bed, however, the Clarion or Eagle seam, makes a splendid coke, and the Lower Kittanning or Campbell's Creek seam, can also be coked successfully in some regions. Hence the territory along the Elk and its tributaries, the Great Kanawha and its tributaries, as well as the Guyandotte, Twelve Pole and the Big Sandy, abounds in splendid coal beds of this Lower coal measure series.

To the next higher group of rocks geologists have given the name of Barren measures, because the coal beds they contain are usually thin, irregular in thickness and poor in quality. Along with much sand stone, thin limestone and other rocks, this group of beds contains a great deal of soft red shale, and hence it makes a broad belt

of red soil almost exactly in the central line of the State, from Monongalia clear through to Wayne. The thickness of the series varies usually between 500 and 600 feet, except toward the southwestern portion of the State, where it expands in thickness like all the other groups, and measures 800 feet near Charleston.

Although usually meriting the name "Barren Measures," yet occasionally some good coal is found in this group over restricted areas. The Masontown coal or "four foot" bed of Preston county, is one of those exceptions, and the Brush Creek bed which caps the hills at Coalburg on the Kanawha, and furnishes some fine "block" coal in several counties of the southwestern part of the State, is another. These two beds belong in the lower half of the group, and the last named is the lower one. The "Barren Measures" are limited above by a great bed of coal, the most important one in the Appalachian field, the famous Pittsburg bed. This bed marks the beginning of another, and the last of the groups of the true coal measure rocks, which is termed the "Upper Coal Measures." This series, unlike those below it, attains its maximum thickness and importance at the northern end of the State, instead of the southern. In Monongalia county it has a thickness of 380 feet, and contains four valuable coal beds, disposed as follows: At base, the great Pittsburg bed, with a workable thickness of seven to nine feet; forty feet above this comes the Redstone bed, with a thickness of four to five feet; sixty feet above the latter lies the Sewickly bed, having a thickness of five to six feet, while 260 feet above the last, and capping the series, we get the Waynesburg bed, with a workable thickness of six to seven feet. Thus it happens that in many of the hills of Monongalia twenty to twenty-five feet of merchantable coal may be mined without shafting.

In coming southward from Monongalia the Pittsburg, Sewickly and Waynesburg coals hold their usual thickness through Marion county, but the Redstone beds thin out before reaching there, and on beyond Marion the Sewickly and Waynesburg beds dwindle down to thin and unimportant layers, leaving the Pittsburg as the only valuable coal in the group, but the latter maintains such a standard of thickness and value as to amply compensate for the loss of the higher members possessed in more favored Monongalia and Marion. As we pass westward from the Monongahela river, in

the last mentioned counties, these Upper coal measure beds dip beneath the surface down into the great trough of the Appalachian basin and do not come up to daylight again till we reach the Ohio river valley near Wheeling, and here we find that only the Pittsburg remains important, the others being represented by thin and slaty beds, hence it will be observed that so far as our State is concerned the Upper coal measures derive their chief importance from the presence of one bed, the Pittsburg, but it is so valuable as to merit a more detailed description than could be given to the other individual seams within the limited space of this article.

This Pittsburgh bed, as we have already stated, is the most important seam in the entire Appalachian field. It is the same bed which furnishes the coal for the manufacture of the famous Connellsville coke, and hence is often called the Connellsville and Youghiogheny bed. Coming as it does so high up in the series of rocks, it has suffered more from erosion than any other of the coal beds below it, having been worn away from many thousands of square miles, where it once existed. This we realize when crossing the Alleghanies to Piedmont, and find the same Pittsburgh bed represented in the "Big Bed" of that region and the George's creek basin, where it is fifteen to twenty feet thick. We also discover the same coal bed on the heights at Elk Garden, on the West Virginia Central Railroad, and in the isolated patch at Fairfax Summit, more than 3,300 feet above the sea. The remnant of this bed in Copeman's Knob, near Kingwood, the scattered patches on the hill top around Newburg, and the few acres of it on the highest summits near Belington, taken in connection with the Fairfax and Elk Garden areas will give the reader some idea of the vast intermediate surface from which it has already been mined by the ceaseless action of the elements. But fortunately for our State, the deepest portion of the Appalachian trough passes across its territory from the Pennsylvania line clear through to the Kentucky border in Wayne county, and has thus preserved for us in its ample fold, a very large area of this valuable bed. Its outcrop has been followed from the State line southward past Morgantown, Fairmont, Clarksburg, Weston, Troy, Glenville, Sutton, Sissonville, and on the Great Kanawha at Raymond City. Beyond this river the coal is thin, and found in interrupted patches, but it has recently been

opened in the tops of the hills back from Huntington, and the last patch of it within the State is in the summit of a high knob overlooking the Big Sandy, and ten miles above its mouth. Kentucky receives all of the coal beds under this one from our State, but she gets not an ounce of the great Pittsburgh seam, for it passes into the air over the tops of her highest hills, from a point in our State within a stone's throw of her territory.

On the Ohio river side of West Virginia, this bed comes into the tops of our hills opposite Steubenville, and dipping down from the north is only 100 feet above water level at the mouth of Wheeling creek. It has thus been the bed rock of Wheeling's industries and prosperity, and it is the foundation stone on which her sister city, Pittsburgh, has built such a grand superstructure of manufacturing interests. And notwithstanding the temporary advantages of natural gas, this coal bed will be the main source of the future greatness of the two cities.

Followed below Wheeling, this coal gradually approaches the river level and passes beneath the same a short distance below Benwood, and although it is reached by the shafts at Moundsville, the horizon of the coal keeps constantly below water level till we reach the Volcano oil uplift, a short distance below St. Marys. Here the place where it should be is lifted 250 to 300 feet above the river for two or three miles, but the coal is wanting or so thin that it is practically absent, and the same thing is true all along this arch from Eureka thr ugh by Volcano to Burning Springs and beyond toward Spencer. How broad this barren belt may be we cannot yet certainly determine, owing to want of observations in the central part of the State, but there are some reasons for believing that this barren region is coincident with the course of the Volcano arch, and that it thus extends from Eureka through to Burning Springs on the Great Kanawha, 10 miles above Charleston; and that along this line for a distance of several (10 to 15) miles on each side, no valuable deposits of this coal can be found. We know, however, that the coal comes in again west of this arch, for when the Ohio turns north below Letart Falls the rise of the rocks soon brings the coal to the surface at Hartford City and other points in that region, where it is still a valuable bed, though much reduced in thickness from its normal size at the northern end of the State.

The counties then which have this great coal bed may be enumerated as follows: About one-half of Brooke, nearly all of Ohio, all of Marshall, Wetzel, Tyler, Doddridge, the eastern halves of Ritchie and Gilmer, the northern half of Braxton, the large areas in western Upshur, Barbour and Taylor, much of Lewis, nearly all of Harrison, three-fourths of Marion, and two-thirds of Monongalia. On the west side of the barren strip, this coal will be found in the portions of Putnam and Mason north from the Great Kanawha, probably all of Jackson, and the most of that portion of Kanawha north from the Elk and Kanawha rivers.

Of course under much of this large area, the bed can only be reached by shafting, but a depth of 300 to 400 feet will reach it along most of the valleys, even where it is deepest, except near the summits of the divides, where it is deeper of course, but still within the limits of easy access whenever the time shall come that it is needed for fuel supply.

One of the finest areas of this coal, and the most easily accessible, lies along the Monongahela river, between the Pennsylvania line and the tier of counties through which this river flows, viz: Lewis, Harrison, Marion and Monongalia. The distance from the State line to Weston, by the meanders of the river, is more than one hundred miles, and throughout this long distance the great Pittsburgh bed is almost constantly above water level, and cropping out from either bank of the stream at a moderate elevation above the same, so as to be most fortunately situated for cheap and successful mining.

The universal excellence of this coal for all purposes of fuel, gas, coke and every other use to which coal can be put, renders the field in question one of the most valuable in the country, or in the world for that matter, and the railroad that first opens it up to market will have a monopoly of good things in the coal traffic for a long time.

It was formerly supposed that this coal would not make merchantable coke, but the successful working of nearly 200 ovens at Montana, on the Fairmont, Morgantown and Pittsburgh railroad, together with the successful plants at Fairmont, Clarksburg, Tyrconnell, Monongah, etc., have set this question happily at rest, and proven that the coal in question will make a coke but little inferior,

if any at all, to that from the celebrated Connellsville region, of which the Monongahela country is simply a southward extension.

THE BASIS OF OUR PROSPERITY.

It will be seen from the hasty and imperfect review of the coal fields of our State that the quantity of this valuable fuel which underlies the surface of our hills and valleys and mountains, is almost beyond conception, and it does not aid the mind much to be told that if we put the workable thickness of coal underlying the 10,000,000 acres of our coal field, at only ten feet, the available product will be at least 100,000,000,000 tons. But impossible as it may be to comprehend the real meaning of such an array of figures, we can at least be assured that the basis of our future prosperity is grounded so firmly in this wealth which lies hidden in our hills, that nothing conceivable to human reason can thwart our growth or prevent our continued progress in everything pertaining to industrial welfare.

The West Virginia coal field is one and a half times larger than that of Great Britain, the production of whose mines is now nearly two hundred million tons annually. In the not distant future when the network of railways which the benefactors of our State are now planning for its development, shall have connected our mines with links of steel to the great arteries of trade and commerce, and our production of coal shall have risen to even half what Great Britain's is, then will our people begin to realize more clearly the enormous value of the fuel wealth to which we are heirs.

The outline of the distribution of the coals of West Virginia, by Professor White, given above, together with the brief descriptions of the coal of each county given in the subsequent pages of this volume, will suffice to give a general idea of the coal fields of the State. The space at our command is not sufficient to permit a more full description.

With this almost limitless amount of coal locked up in the bowels of the earth, comparatively little has ever been done toward its development. With sixteen thousand square miles of coal but 200 collieries are now in operation. The total capital invested in the production of coal in this State, according to the last census, is

$10,508,050. The total number of persons employed in and about the mines of the State in the last year was 15,393. It is only within the last few years that the coals of West Virginia have attracted any attention from the men in other States who had the capital to develope them, but the growth of the mining industry since that time has been rapid. Twelve years ago less than a sixth as much coal was produced annually as is now mined. In 1880 the State ranked seventh in the Union in the production of coal; last year but three other States produced as much as West Virginia. The growth of the business is shown by the following table:

YEARS.	Inside Miners.	Outside Laborers and Coke W'rk'rs	Total Production Ton 2,000 lbs.	Percentage of Increase.	Average Annual Increase.
1880	2,553	1,173	1,404,008	.....	Average annual percentage of increase from 1881 to 1892, 17.21.
1881	3,063	1,407	1,803,984	28.48	
1882	3,573	1,641	2,416,960	33.90	
1883	4,438	1,956	3,142,234	30.00	
1884	4,627	1,724	3,249,839	3.40	
1885	5,486	1,806	3,369,062	3.60	
1886	6,081	1,181	3,598,664	6.80	
1887	7,023	1,582	4,936,820	37.18	
1888	7,269	1,705	5,375,564	8.89	
1889	7,764	1,882	5,405,173	0.55	
1890	9,173	2,324	6,002,080	11.04	
1891	10,434	2,589	8,155,202	35.87	
1892	9,884	5,509	8,710,888	6.81	

This increase, rapid as it has been, would have been much larger, but for the want of adequate facilities for the transportation of the coal. Every railroad in the State that passes through coal regions has all it can do to handle the product of the mines along its line and the development of new fields is much retarded from this cause. The construction of new roads, the double tracking of old ones, and the purchase of hundreds of new cars and other equipments are assisting materially in developing the coal, but still there is room for more. The railroads can little more than handle the present output of the mines and as fast as new ones are built they are crowded to their fullest capacity. Those sections which are favored with river transportation suffer less from this cause than the others, but every new facility for reaching the market materially increases the output of the mines. The activity in railroad building in this State indicates that this can not longer remain the cause for the want of proper growth of the mining industry. Last year the State

stood first of all in the amount of railroad built within the year, and from all the indications, bids fair to do the same again this year. New lines are projected in every direction and through all the counties of the State, and ample facilities will soon be afforded for all the shipments of coal that may be desired.

Several causes combine to give the coals of West Virginia their enormous value—the great area and thickness of the beds, making the largest deposit of coal in any State in the Union; the purity of the coal, which is singularly free from sulphur and other impurities; the variety of the kinds found, anthracite, splint, cannel and bituminous all being found, and all but the first in enormous quantities and frequently upon the same property; the value of the coal, much of which commands a higher price in the market than other similar coals; the ease with which it can be worked, in half the State, perhaps, the coal all being above the water level, and in all the rest being much nearer the surface than is the coal of other places which is constantly worked, as in England where shafts are put down as deep as 2,600 feet below the surface of the earth, the shaft costing half a million dollars; the nearness to market, being much nearer to the southern and western markets than is the coal of Pennsylvania, its only competitor, and having several through lines to the north-west and the east; its nearness to the great Virginia iron ore fields, where much iron is now made and more will be; the cheapness of the lands upon which the coals are found and the cheapness with which it can be mined, the average cost of mining coal in West Virginia being lower than in any other State in the Union save one.

ANTHRACITE COAL.

The amount of anthracite coal in the State is comparatively small, though there is enough of it to be of considerable value. It is found in but two counties—Berkeley and Morgan—lying in the hills that separate the two. As long ago as 1835 the owners of some property in these counties had some investigations made to see what amount of coal there was there and the value of it. A six-foot vein of anthracite coal was then found, but water filled the mine and it was abandoned. At various times since then efforts have been made to ascertain the extent and value of the coal deposit, but until

recently nothing was done in a determined way, and little more was known than that there was anthracite coal in the hills, and that it was pretty hard to get at. In 1883 further efforts were made by other parties to get at the coal and a ten-foot vein was struck. This shaft also filled with water and remains so to the present time. In 1889 an experienced mining engineer was sent from Pottsville, Pa., to look into this property and report upon it. His report says the coal is "of fair quality and compares favorably with Pennsylvania anthracite coal." Later a New York geologist was sent to look into the field. He made an opening and at five feet from the surface, struck the top of the largest seam of coal yet found. The shaft was sunk to the distance of forty-two feet. His report says: "At five feet from the surface the top of the coal was reached and the shaft continued in coal to the bottom. At the bottom a cut is made across the vein from east to west. This is cut from wall rock to wall rock, and is 24 feet 9 inches wide and develops a width of 15 feet 7 inches of good anthracite coal." The coal is found in four beds, separated slightly, one of which contains 5 feet 9 inches of solid coal, another 4 feet, one 26 inches and the fourth 44 inches. He says, "There are not less than five seams of anthracite coal in 'Third Hill' mountain." This seam has been followed and its presence shown by openings for a distance of twenty-five miles. No coal has ever been mined here save the few samples taken out by persons prospecting. Several analyses have been made of the coal from this deposit, a few of which we give as follows: One gives the water and volatile matter at 11 per cent., the fixed carbon 82.54, and the ash 6.46. Another gives: fixed carbon 88.05, volatile matter 5.28, and ash 6.66. Still another gives: moisture at 100 degrees, 2.45, volatile matter 6.85, fixed carbon 86.29, ash 4.40.

SPLINT COAL.

The splint coal is a very hard variety found principally in the Middle and Lower measures and almost entirely in that part of the State between Braxton county in the center and Wayne in the southwest, the borders of the area extending for a considerable distance on either side of the central line. The coal is thus spoken of by Professor Maury: "For the combined purposes of

steam, domestic use and the manufacture of iron, it may be looked upon as the most useful and valuable coal of the State. Its value is due to its firmness and solidity, which enables it to be handled, shifted and stored with very little loss; it burns well, leaving but little ash; has both high calorific power and intensity; is usually remarkably free from sulphur (iron pyrites) and other impurities; has little or no tendency to clinker; is free from the danger of firing by spontaneous combustion—a great desideratum in storage and ocean transportation; is first rate as a steam and household fire and has a particular adaptability in the raw state to the manufacture of iron in the blast furnace, for which purpose it is eagerly sought in districts accessible to market, as it makes a quality of iron which can only be surpassed by the use of charcoal." It is an especial favorite for shipping because of the small loss in handling or from exposure to the weather and finds a ready market from the variety of uses to which it is adapted. It is mined extensively in the Great Kanawha valley and along the western end of the Norfolk & Western railroad in this State. The coal is very hard but splits easily and smoothly and is mined in large lumps. In some of the Wayne county mines the coal has a tendency to split into long and thin pieces so that it has been likened by some to fence rails.

CANNEL COAL.

The cannel coal is one of the most valuable varieties found in the State. It is rich and oily, and contains a larger proportion of volatile matter than any of the other coals found in the State. Its appearance is doubtless known to all our readers. Of a dull, black color, the coal will take, when polished, a brilliant lustre. It is more tenacious and less brittle than other coals and may be cut or carved into any shape. The coal is clean and will not soil the whitest surface and yet contains a large amount of oil. It was from the rich and oily cannel coal that oil was made before the war. From good cannel coal from 40 to 80 gallons of crude oil were produced to the ton; the Peytona coal yielding 20 gallons of crude illuminating oil, 52 gallons of crude lubricating oil, and 7.2 gallons of oily paraffine. Total 79.2 gallons to the ton. The discovery of petroleum made oil so much cheaper than it could be made from coal that the "cannel coal oil" was soon displaced and gradually fell into disuse. But for

making gas there is no better coal, more gas and that of greater brilliancy being produced from a pound of cannel coal than from any other coal found in America. For fuel the cannel coal is not surpassed. It burns with a brilliant light, makes an intense heat and leaves but little refuse. It brings a much higher price than any other coal found in the State.

BITUMINOUS COAL.

By far the most widely distributed coal found in the State is the ordinary bituminous coal, valuable for fuel, gas, steam and coking purposes. It is found in almost every county in the State and in great variety. Not only is it found in counties where the other coal is not, but nearly always in the same veins with other coals, bituminous is also found. This coal is mined more than any other in the State, and by reason of the greater variety of uses to which it may be put and the cheapness with which it may be mined, the demand for it is greater than for any other kind. The veins vary in thickness from a few inches to more than 20 feet and the character of the coals varies almost as much. While splint and cannel coals are largely mined, it is the softer coals that give the value to the coal fields of West Virginia, and employment to thousands of its people. From them the famous West Virginia coke is made, which rivals the celebrated coke from Connellsville, and in the manufacture of which long rows of blazing furnaces may be seen from almost any passing railroad train, brightening the hillsides with their lurid light and filling the valleys near them with their smoke.

The character of the West Virginia coals can be seen from the analyses given in the following tables. Their richness in both volatile matter and fixed carbon, their freedom from injurious sulphur and ash, their many points of excellence and their superiority over other coals whose analyses are also given may all be noted by the careful observer.

ANALYSES OF COALS.

NAME OF COLLIERY.	County.	Fixed Carbon.	Volatile Matter.	Water.	Sulphur.	Ash.	Authority.
Crown Hill	Kanawha	62.61	33.26	2.14	0.18	1.81	Dewey, Vance & Co.
Coalburg	"	62.00	33.50	3.65	0.35	1.50	D. G. M. Levette.
Paint Creek	"	63.74	30.13	.....	.....	6.13	R. O. Doremus.
Paint Creek	"	60.77	36.26	1.84	.....	1.13	P. B. Wilson.
Acme	"	57.90	37.09	1.93	0.62	3.08	E. L. Howard, U. S. G. S.
Acme	"	53.22	41.36	1.66	0.80	3.75	"
Black Band	"	57.48	38.58	2.24	.....	1.70	R. M. Byrnes.
Blacksburg	"	56.75	41.17	1.23	.....	0.85	
Cedar Grove	"	61.27	36.83	.....	.....	1.90	
Winifrede	"	58.73	36.33	1.36	0.36	2.72	Winifrede Coal Co.
Peel Splint Coal Co.	"	57.78	35.34	1.75	.....	5.13	A. R. Otter.
Average Kanawha Gas Coals	"	56.26	37.36	1.25	1.28	3.85	C. & O. Coal Agency.
Gauley Mountain	Fayette	64.00	32.60	1.40	0.23	2.00	W. N. Page.
Powellton	"	61.75	34.91	0.94	0.16	2.40	Hy. Froeling.
Great Kanawha	"	58.43	38.48	0.62	0.56	1.91	"
Great Kanawha	"	59.89	34.61	1.14	0.81	4.36	A. S. McCreath.
Crescent	"	59.10	36.72	...	1.27	2.91	J. W. Mallet.
Black Peerless	Kanawha	58.62	38.05	0.90	0.77	2.43	F. P. Dewey, U. S. Govt.
Campbell's Creek	"	61.07	35.64	1.51	0.37	1.21	Riverside Iron Co.
Nuttallburg	Fayette	70.67	25.35	1.35	0.57	2.10	Prof. Eggleston.
Nuttallburg	"	69.00	29.59	0.34	0.78	1.07	C. E. Wright.
Fire Creek	"	75.50	22.42	0.73	0.53	0.80	A. S. McCreath.
Quinnimont	"	79.29	18.65	0.76	0.23	1.11	Prof. Eggleston.
Average of all New River Mines	"	74.04	23.20	0.83	0 50	1.43	M. F. Spruce.
Average of 10 samples Flat Top Coal	Mercer and McDowell.	74.06	18.83	0.69	0.76	5.64	A. S. McCreath.
Pratt's Lands	Webster	68.20	29.40	0.95	0.55	1.45	Hy. Froeling.
Twelve Pole	Wayne	56.35	37.60	1.60	0.57	6.05	Wormley.
Stevens' Branch	"	60.10	36.40	1.70	0.72	3.50	"
Tug Fork	"	61.18	38.74	.....	.....	1.88	Taylor.
Cassville	"	44.89	43.22	1.56	0.82	10.33	Dwight.
Ferguson	"	51.35	38 70	3.45	1.92	6.50	Hy. Froeling.
Peytona Cannel	Boone	41.00	46.00	.....	.....	13.00	Manhattan Gas Light Co.
Cannelton Cannel	Kanawha	23.50	58.00	.....	.....	18.50	"
Lost Run Cannel	Taylor	42 32	23.08	.....	.....	34.01	C. E. Dwight.
Twelve Pole Cannel	Wayne	42.59	49.40	.....	.....	7.41	"
Redstone Coal	Monongalia	54.36	37.88	0.37	2.87	7.39	"
Redstone Coal	Marion	50.33	40.97	1.01	4.27	7.69	"
Sewickley Coal	Monongalia	54.31	35.78	0.44	3.10	9.47	"
Waynesburg Coal	"	56.36	35.36	0.74	0.70	7.55	"
Clements	Marion	55.02	37.00	1.00	0.80	6.00	A. S. McCreath.
Montana	"	56.57	36.78	1.42	0.71	4.51	"
Monongah	"	53.48	36.92	1.52	1.08	7.00	"
Despard	Harrison	53.03	34.00	.....	.....	6.07	Washingt'n Gas Light Co
Howard	"	55.76	37.36	1.10	1.82	3.96	S. C. Ford.
Austen	Preston	58.00	38.00	1.50	0.50	0.20	P. B. Wilson.
Davis	Tucker	67.18	26.84	0.80	1.68	3.50	
Thomas	"	72.76	22.90	0.96	0.59	2.79	J. W. Powell.
Boggs Run	Ohio	46.30	43.29	1.20	.....	9.30	C. E. Dwight.
Moundsville	Marshall	44.30	45.17	1.01	1.23	8.29	"

TIMBER.

The claim is made, and figures are given to prove it, that West Virginia has a greater amount of hard wood timber in its forests than any other State in the Union. Ex-Governor Wilson says: "I have the statistics to prove that West Virginia has *more of a surplus of hard woods than any other ten States in the Union.*" This is rather an extravagant claim for so small a State but a thorough examination of the forests will show that nearly or quite one-half the State is still uncleared, and by far the greater portion of the uncleared lands is still in virgin forests where the axe of man has never found its way and where the magnificent specimens of forest growth stand thickly side by side and reach a towering height which gives the forests of the State their splendid values. Except in California where the redwood trees attain tremendous size no finer timber may be found within the confines of the Union than that which grows in West Virginia. The splendid forests of thousands of acres of untouched timber, where nearly every kind of timber found in the North American continent may be seen, where trees grow to such size that ordinary methods will not suffice to handle them and where the forests are so thick that the light of day scarce penetrates their shade and pathways must be cut before the axemen can find room to work, have yielded annually many million feet of timber which has gone to nearly every country on the earth and given the West Virginia timber a world-wide reputation. From European countries capital has come and been invested in the woods of West Virginia, and agents come from England every year to purchase West Virginia timber. No finer oak or poplar grows beneath the sun than that which may be found in almost any county in the State. The magnificent size, the excellent quality of the timber and the great variety give to the timber lands of West Virginia unusual value and have, particularly in the last few years, attracted

the attention of timber men from almost every quarter. Some ten or fifteen thousand men are now engaged in one way or another in timber, lumber, sawmill or kindred business. Tremendous onslaught has been made upon the forests. Great armies of choppers have, with their axes, made inroads on the woods throughout the State and every rise brings out of every stream, however small, its quota of logs or ties or other timber. It is almost impossible to get any statistics on the lumber business and the amount of lumber cut annually in the State. In 1880 the total amount of various kinds cut within the State was about 180,000,000 feet. To-day it is far more than twice as much. New sawmills are building every day, new territory being opened, and it is safe to say that now the total cut of all the mills is no less than 500,000,000 feet a year. The forests are being rapidly destroyed. Not only trees of proper timber size are being cut, but smaller ones for telegraph poles and railroad ties are also taken out. The trees both large and small, the bark for tanbark and small hickories for hoop-poles are all removed and but a short time is required to change a forest to a farm, to bare the mountain tops and clear their sides, to turn the timber into ties or work it into lumber or its products. To show the size of some of the trees cut from the West Virginia forests we give the following measurement of a poplar tree recently milled at Camden on the Gauley, cut in Nicholas county in one of the finest poplar regions in the State:

2	Logs	60	Inches	Diameter,	16	Feet	Long,	Scaled	5,912	Feet, Board Measure.
2	"	63	"	"	16	"	"		6.802	" "
1	"	63	"	"	12	"	"		2,611	" "
1	"	69	"	"	10	"	"		2,611	" "
2	"	Broken, Scaled							6,761	" "
	Total								24,727	" "

DISTRIBUTION AND VARIETY.

Writing of the forests of West Virginia for the World's Fair edition of the Baltimore *Evening News*, Maj. Jed Hotchkiss, one of the best posted men in the South, particularly on the resources of the two Virginias, has the following to say:

"West Virginia is undoubtedly the timber State of all the States east of the Mississippi; in fact of all the States on the Atlantic slope

of the continent. Fully three-fourths of its 24,645 square miles of area are still covered by virgin forests, and in all the remainder of the State where the forest maps indicate that the valuable timber has been largely removed, there are still large numbers of timber trees included in the portions of farms that are held for forest purposes.

"This State is very favorably located for the growth of forests. It is in the favored belt of temperature between about 37 degrees and 41 degrees of north latitude. Within its boundaries, trending northeast and southwest, thus opening the country to the damp, warm winds from the Gulf, are numerous ranges of the great Appalachian, or Atlantic Highlands, but by far the larger portion of the State lies on the westward slope of these mountains in the Trans-Appalachian belt, the waters of which mostly run to the northwestward to the Ohio. The altitude of the country descends from the Backbone or Alleghany range of the Appalachians, from an altitude of from 2,500 to 4,500 feet to from 500 at the southwestern corner of the State on the Ohio, at Kenova, to about 600 on the same river at Wheeling. The altitude of the eastern corner of the State at Harper's Ferry is 272 feet; so the range of altitudes in the State is from 272 feet to about 5,000, giving a climatic range of 4,728 feet or the equivalent of about 16 degrees of latitude; consequently this State has extensive areas of adaptability for every variety of forest growth that is found within the limits of the United States east of the Rocky Mountains. Dr. Charles F. Millspaugh, in his Preliminary Catalogue of the Flora of West Virginia, 1892, says of this State: 'It appears to be the southern limit of many boreal, the northern of many austral and the eastern of many occidental forms. It bids fair also to continue to present many novelties.'

"The most elevated portion of the State, the great eastern border of the ridgy plateau from which the Trans-Appalachian country descends, a territory some 200 miles in length from the head waters of the Big Sandy to the head waters of the North Branch Potomac, a region that in the main is from 3,000 to 5,000 feet in altitude, furnishes a congenial home to the black spruce, the white pine, and other evergreen trees peculiar to northern latitudes.

"It is probable that nowhere in the United States are now existing denser forests than those of black spruce in the belt of country,

more than 100 miles in length and from 10 to 20 in breadth, that extends through Greenbrier, Pocahontas, Randolph and Tucker counties. From measured acres of this territory as many as 60,000 feet of board measure of lumber have been cut. Only the northern end of this vast spruce forest has been penetrated by railways, the West Virginia Central & Pittsburg R. R. being the only one that has yet really entered into it. In this same elevated region there are extensive forests of wild cherry of a luxuriant growth. One white pine belt, with a length of 70 miles and an average breadth of 10 miles, borders this spruce belt on the southeast in the basin of the Greenbrier river. Another white pine belt, some 60 miles in length and having an average breadth of 10 miles, penetrates this spruce belt from the northeast up and along the basin of Cheat river; while another white pine area, some 30 miles in length and 10 in breadth, is found in the counties of Raleigh and Wyoming. On the crests and higher slopes of the dozen or more mountain ranges of the Appalachian system that traverses the State in a northeast southwest direction from its eastern border to the westward, are found other species of pine and several species of birch, oak, maples and other trees such as are peculiar to the higher altitudes of the country.

"The remainder of the State is covered mainly with hardwood forests interspersed with a per centage of the softwoods such as poplars, ash, etc. As an illustration of the kinds and distribution of these trees an example may be taken from the southwestern portion of the State, from the basin of the West Fork of 12-Pole river, in Wayne and Logan counties, where the merchantable timber on 12,263 acres, or nearly 20 square miles, was actually measured and counted. The trees that were measured were those that were 18 inches in diameter and upward, four feet above the ground, with the exception of locusts, hickories and black walnuts which were measured from a diameter of 10 inches and upward. The varieties and numbers of commercial timber trees at this time growing on this area are as follows:

1.—TABLE OF HARDWOODS.

1.	White Oaks	24,760
2.	Chestnut Oaks	38,848
3.	Black Oaks	8,525
4.	Red Oaks	943
5.	Hickories	21,298
6.	Chestnuts	7,681
7.	Locusts	1,996
8.	White Maples	1,583
9.	Sugar Maples	450
10.	Birches	1,344
11.	Gums	1,044
12.	Black Walnuts	393
13.	Sycamores	13
	Whole number of Hardwood Trees	108,878

2.—TABLE OF SOFTWOODS.

1.	Tulip-Poplars	12,450
2.	Pines	3,472
3	Lindens	2,325
4.	Cucumbers	240
5.	Buckeyes	28
6.	Ashes	271
7.	Hemlocks	903
	Whole number of Softwood Trees	19,689

"This summary shows that this area contained 128,567 timber trees of 32 species; 25 of these kinds or 108,878 trees, were hardwoods; and 7 of these, or 19,689 trees were softwoods; making the percentages of the whole number of timber trees as 84 per cent. of hardwoods and 16 per cent of softwoods. The average number of these timber trees to the acre is ten and a fraction.

"Interspersed with the trees of these tables are found nearly all of the varieties of smaller trees that are subsequently named in this article as exhibited in the West Virginia collection at Chicago. These countings were made on lands extending from the West 12-

Pole River up to the summits of the dividing ridges on either side taking in a range of altitude from about 650 feet to a little over 1,000 feet. This specimen of forest fairly represents the entire northwestern portion of the State from the Ohio River to the southwest for about 75 miles. In other words, a belt of country 160 miles long from northeast to southwest and 75 miles wide from northwest to southeast.

"Another illustration of the distribution of commercial trees for the intermediate country between the high plateau and the belt above mentioned may be taken from the counting of a thousand acres on the headwaters of Cherry River in Greenbrier county, West Virginia, in a region having from 2,500 to 3,000 feet of altitude. The trees counted and measured were all from 18 inches and upward, except the hickories and locusts. The species and numbers were as follows:

1.—TABLE OF HARDWOODS.

1.	White Oaks	132
2.	Chestnut Oaks	159
3.	Red Oaks	889
4.	Hickories	86
5.	Chestnuts	1,513
6.	White Maples	3,258
7.	Sugar Maples	7,291
8.	Locusts	4
9.	Beeches	1,965
10.	Birches	1,120
11.	Gums	104
12.	Cherries	349
13.	White Walnuts	1
	Whole number of Hardwood Trees	16,871

2.—TABLE OF SOFTWOODS.

1.	Tulip-Poplars	529
2.	White Lindens	1,014
3.	Yellow Lindens	937
4.	Ashes	576
5.	Hemlocks	2,303
6.	Yew Pines	34
	Whole number of Softwood Trees	5,393

"Of these 19 species of trees, 13 are hard woods and 6 soft woods. The whole number of trees is 22,264, of which 16,871, or 76 per cent. are hard woods, and 5,393, or 24 per cent. are soft woods. The average number of timber trees per acre is over 22.

"The differences in the varieties, numbers and percentages of trees shown in these two tables are quite remarkable. The timber belt which is represented by this second table is one that extends across the State for full 200 miles, from McDowell county in the southwest to Preston county in the northwest. It has an average breadth of about 25 miles and is probably the most valuable of the timber regions of the State. As it is bordered on the east by the high region of evergreen timbers first described, it is evident that, taking this belt and that together, making a belt of timber extending somewhat centrally across the State from southwest to northwest for 200 miles, and with an average breadth of about 35 miles, that West Virginia has in this 7,000 square miles of territory one of the most valuable timber regions, in the extent, variety, quality and quantity of its timber now remaining in the United States."

VALUE OF TIMBER.

In addition to this, further information as to the extent and value of the timber forests of the State may be found in the following extract from the article written recently by Maj. John Moulton for the *Kanawha Gazette*, at Charleston, in which he estimates—and his estimate is rather low than high—the value of timber standing in the State at seventy million dollars. He says:

"With the exception of the highest mountain ranges, where there are to be found large forests of white pine and spruce, the timber throughout the State consists almost wholly of hard woods, comprised of the different kinds of oak, chestnut, hickory, poplar (tulip), cherry, black walnut, white walnut, ash, birch, locust, sugar maple, etc. Of these, the oak family is by far the best represented, comprising probably one-third of the entire growth; and of the oaks the white is by far the most plentiful. Next among our valuable timber trees in quantity is the poplar which, owing to its adaptability to so many uses, makes it one of the most valuable timber trees in the whole country. Black walnut and cherry are our most valuable woods and are found scattered throughout the State, but no-

where in great quantity. Ash is also found throughout the State, in greater quantities than walnut or cherry, but much less than poplar.

"Of all the different species of hard woods, oak, poplar, black walnut, cherry and ash comprise principally the hard woods which have been manufactured into lumber, owing to the fact that they only furnished lumber whose price would justify the cost of manufacturing and transportation to distant markets and of these, only excepting walnut, such trees have been used as would make largely the better qualities of sawed lumber, or in oak, staves.

"The mountainous character of the State has also confined operations in lumbering to streams large enough to float logs on to the lines of the railroads, leaving a large part of the State untouched.

"While this characteristic of the State increases the cost of putting the manufactured lumber into the hands of the consumer and preventing its manufacture entirely over large districts, it is not without its future benefit to the State and to the owner as it has curtailed the manufacture, preventing a cut of timber beyond the demands and increasing its value in decreasing the aggregate amount by use only of that more attainable.

"Any estimate of the standing timber in the State can only be a matter of opinion but taking the amount of the surface of the State still covered with timber, which I believe is nearly two-thirds, and deducting from it the lands cut over for good timber along streams and railroads, by a liberal estimate two-fifths of the State is still in the virgin forest or about seven million acres which estimating at two and one-half thousand feet per acre at an average price of two dollars per thousand would make the large sum of thirty-five million dollars as the value of the standing good timber.

"This estimate of the number of acres of timber lands and amount per acre, may be considered small, but it must be taken into consideration that I am only considering such timber, oak, poplar, walnut, cherry and ash, as would make lumber mostly suitable for shipping, and also that parts of the land, such as barren south hillsides, are substantially bare of timber, and that I do not include the white pine and spruce of the upper mountain regions.

"But in regarding the timber values of the State, shipping lum-

ber, or the best grades, should not by any means be alone taken into account.

"Our wild lands, it is well known, are held very generally in large bodies, and valued to a great extent for the minerals underlying them. For the development of these minerals all the coarser grades of timber, comprising every kind of hard wood, will be needed, and will aggregate in value for this home consumption fully as much as that of the higher and better grades.

"Again, unlike some other sources of national wealth, the quantity and quality of the timber of our State, depends on no contingency, and its value must increase, as everywhere the consumption of lumber is greater than the natural growth of the forests.

"Of the quality of our timber there is no longer any question of its being eagerly sought after by manufacturers all over the country."

IRON.

In a recent pamphlet on the iron ores of the two Virginias, Judge Homer A. Holt, of the Supreme Court of Appeals of West Virginia, and Adam C. Snyder, ex-Judge of the same court, give facts and figures to show that in the world's iron production in the future the Virginias must take a prominent part. From an exhaustive treatise on the subject we take the following extracts:

The world's production of iron in round numbers has been as follows:

In 1856	6,600,000	gross tons.
In 1867	9,300,000	" "
In 1878	14,100,000	" "
In 1889	25,000,000	" "
In 1890	26,500,000	" "

The ratio of increase is thus shown to be for the first period of eleven years about forty per cent.; for the second period over fifty-one per cent; for the third a little less than eighty per cent., and for the single year ending in 1890 nearly seven per cent. If this accelerating ratio of increase is maintained, and the probabilities are that it will be greatly exceeded, then the production for the year 1900 will be in excess of fifty million tons.

The relative per cent. of the world's product from 1867 to 1890 has been as follows:

	1867. Per cent.	1878. Per cent.	1889 Per cent.	1890. Per cent.
United States - - - -	14.50	16.80	30.57	33.00
Great Britain - - - -	52.80	45.20	33.16	28.23
France, Germany and Belgium	26.00	28.75	27.98	
All other countries - - -	6.70	9.25	8.29	

It is thus shown that the production of the United States, which was only 14.50 per cent. in 1867, rose in the succeeding twenty-three years to 33.00 per cent., equal to one-third of the entire production of the world, while Great Britain, which up to 1889 produced more iron than any other nation, fell off in the same twenty-three years from 52.80 to 28.23 per cent., nearly five per cent. less than the United States, which is now the leading iron producing country of the world.

The following table shows the pig-iron production in the United States for the past thirty-five years and the per cent. of increase at stated periods:

	Net tons.	Increase.
In 1856 the product was - - -	883,137	
In 1867 " " " - - -	1,461,626	65 pr. ct.
In 1878 " " " - - -	2,577,361	76 pr. ct.
In 1889 " " " - - -	8,516,068	238 pr. ct.
In 1890 " " " - - -	10,309,028	20 pr. ct.

This presents the capabilities and progress of the iron industry in the United States in a degree unprecedented in any other country of the world. The rate of increase in the eleven years ending in 1889 was more than three-fold as great as it was for the eleven years immediately preceding, and that for the year 1890 was over twenty per cent. more than the very heavy product of 1889.

Great Britain, France, Germany and Belgium, together with the United States, produced more than ninety per cent. of the entire iron product of the world. In regard to these the statistics show that neither Great Britain nor France has produced as much in any one year since 1882 as it did in that year, and that the aggregate production of Germany and Belgium in any year since 1883 has exceeded their aggregate product for that year less than one million

tons. Since these, the principal iron producing countries of Europe, have not increased their production to any appreciable extent in the last seven years, during which period the United States has doubled its production, it is safe to assume that they are not likely to increase it to any greater extent in the future.

The increased production of iron in the United States for the year 1889 over the year 1888 was about 800,000 tons greater than it was in all the other countries of the world, and notwithstanding this startling fact the consumption of iron in one form or another by the people of the United States during the year 1889 exceeded the domestic production of that year nearly one million tons It will therefore be concluded that the increased demand of the world for iron must be mainly, if not entirely, supplied by the United States. In support of this conclusion, Mr. Edward Atkinson, in a paper on the future situs of the principal iron production of the world, says:

"What will be the product in the United States in 1900 as compared to 1889 if the world demands forty to fifty million tons of iron? Where will it come from? Who will supply it? Will it not be sixty per cent. of the whole or more? * * * If the increase from 1890 to 1900 should be ten per cent. per annum the product of the year 1900 will be about 42,000,000 tons. From what other section of the earth's surface will an additional supply of iron, rated at the lowest at 1,000,000 tons a year, year by year, and perhaps rising in years of extensive railroad construction to double or treble, be derived? * * * I may not venture to say in this treatise that the supremacy in this branch of industry has passed away from Great Britain, but the increasing scarcity of her fine ores, the increasing depth of her coal mines, the great heat and difficulty in working them, the near exhaustion and consequent high price of coking coal and the change in the condition of the workmen in Great Britain may sustain such a conclusion. The question is not, however, whether the United States will take away any part of the present iron production from Great Britain. The true question is: *Can the iron producing countries combined, readily meet the prospective increase of demand?*"

Ever since iron has been produced by the use of mineral fuel in this country, Pennsylvania has made more than one-half of the entire output. Next to Pennsylvania, though far behind her, the States

of Ohio, New York, Illinois and New Jersey have, until the last few years, been the principal iron producing States. These older producing States have, in a measure, exhausted all their easily available ores. They are obliged to depend largely upon a basis of supply hundreds of miles from their furnaces. Of these States, Pennsylvania and Ohio are the only ones that have any considerable quantity of both iron ore and coal within their own territory, and each of these States obtains the greater part of its iron ore supp'y from the Lake Superior mines, or by the importation of foreign ores on which latter they have to pay a duty of seventy-five cents per ton. Neither New York nor New Jersey has any coal, and Illinois has no iron ore within the State.

In the growing competition of the iron industry and the lessening of its profits, iron must be made where the conditions are most favorable and where it can be made the cheapest, and not where it is made at present, simply because it has been made there heretofore to advantage.

Industry must, and always will, sooner or later, adjust itself to the most favorable conditions. It finally becomes simply a question of "the survival of the fittest." The present state of the iron production in these older States is largely maintained by the momentum of the great capital invested in plants and ways for transportation in the centres of iron making. This cannot be changed on a sudden, but when competition from points possessing more favorable conditions reduces the price of the product below the cost of production, then, if not sooner, the change will be made. It may not be ventured to assert that this state of affairs has already arrived, but it is possible to believe that the present depression in the iron industry is in part, if not largely, due to the persistent efforts of interested capitalists and railroad companies to maintain the major part of the industry at points where iron production has ceased to be remunerative. If the capital which is invested in plants and means of transportation in the older iron producing sections were transferred to more favorable localities, iron could be produced there at present prices at a fair profit. The depression, therefore, is due less to the price of iron than to the disadvantages and unfavorable conditions under which it is produced.

Three things are essential to the production of iron, namely, ore,

coal and limestone; and these must be so situated geographically as to be cheaply brought together; for the value of raw material does not more consist in what it is than *where it is*.

The "centre of gravity" of the iron industry will, sooner or later, adjust itself at the point where the facilities for obtaining the raw material are the best and the cost of assembling them at the furnace is the least. These requisites, as we have seen, do not, to the extent desirable, exist at the points where the principal iron production is now and has heretofore been maintained. The important inquiry then presents itself: Are there any points within the United States possessing conditions more favorable for the production of iron cheaply?

In maintaining that the South has superior natural resources for the production of iron, and that in the near future it will attain an important, if not the controlling, position in this industry, it is not necessary to assert that there will be any immediate decrease in the production in other sections. It is maintained, however, and the facts seem to warrant the conclusion, that in view of the more favorable natural conditions of the South, it is not probable that any important part *of the increased production* necessary to meet the prospective demand will be had in the older producing States. It may, and probably will for years, tax the capabilities of all points and sections within the United States to supply, not only the present, but the enormous prospective demands of the world.

In 1870 the South produced only 184,540 tons of iron; in 1880 she increased her production to 359,436 tons, and in 1890 she made the phenomenal advance to 1,780,909 tons, or over eighteen per cent. of the entire product of the United States. This was an increase of seven per cent. of her relative production in the decade from 1880 to 1890, thus showing that the North and West fell off that much.

The greatest activity in the development of the iron industry in the South during the last decade was in Alabama, and in the past few years it has been very great in Virginia. The increase over the production in 1880 in the former was 1,328 per cent. and in the latter 1,589 per cent. Of the thirty-nine furnaces under construction at the close of the census year 1890, nine were in Virginia and seven in Alabama and only five in Pennsylvania.

The facts above stated show the great importance that must attach to West Virginia ores, which, though yet practically undeveloped, nevertheless are known to abound in many, if not most, of the counties of the State.

At various times, before and since the organization of the State, iron has been made from West Virginia ores. Small furnaces have been operated in nearly all the counties where iron ores are found and in many counties utensils are now in use which were made many years ago at local furnaces and foundries. The ores, in nearly every instance, produced an excellent article of iron and made the business profitable while it lasted. The mountainous character of the State, the absence of railroad facilities and the difficulty of getting articles of iron into the country homes from far-away markets, was the necessity which brought about the erection of iron furnaces throughout the counties of the State where iron ores are found. They were operated only for local use and were necessarily small. When railroads began to be built into the State and iron made at larger furnaces in older localities and with better facilities began to be sent in by rail, the business of the local furnaces ceased. Gradually they all closed down, and now there is not a furnace running in the State. But still the ores are here, of sufficient richness and in sufficient quantities to be profitably worked, if railroads were to open up the valuable ores. In nearly all the counties through the centre of the State, from Monongalia and Preston southward clear to Wayne, ores of greater or less value may be found. In many of these counties iron has been made but the finest ores, the richest and the most, are found in the eastern border counties along the Alleghany mountains. In all these counties ores abound, of splendid quality and in large seams, but owing to the difficulty with which they can be reached by rail, no development has ever yet been made. Just across the border, in Virginia, numerous furnaces have been in operation making iron for years, and for all these furnaces the coal and coke is taken from the West Virginia beds to use in making iron. On this side of the mountains we have the same iron ores which are so successfully worked in the old State, we have the limestone for the fluxing, we have the finest coking coal in the world and almost at the mouth of the ore pits, so that iron at least the equal of the Virginia iron

could be successfully made in our own State and at a smaller cost than on the eastern side of the line.

The Alleghany mountains form the entire eastern border of the State, and from Jefferson county, in the north-east, to Mercer and McDowell on the south-west, the same kinds of valuable iron ores are found in great abundance. The same are found on both sides of the mountains in the two Virginias. In the old State more has been done toward their development than in the new and they are better known, but in some parts, at least, of the western State, the ores excel those of the eastern neighbor and in nearly every part are similar to those similarly situated across the border. Professor Orton, a somewhat noted geologist of Ohio, who has made an examination of the Potts Valley ores, lying partly in Virginia and partly in West Virginia, has made a very favorable report upon them. As the greater part of the iron ores in the eastern border counties of the State are similar to these described, we quote from Professor Orton to give a general idea of the ores of the Alleghany counties of the State. He says:

"The Oriskany ore is in all cases a hydrated peroxide or limonite, popularly known as brown hematite. * * * Potts Creek ores, which I sampled in the field and the analyses of which have just been completed by Prof. N. W. Lord, Chemist of the State Geological Survey of Ohio, show the composition given below, the samples having been selected from eight different points in the ore field, numbered, respectively, from one to eight.

	1	2	3	4	5	6	7	8
Iron - -	49.90	50.03	51.94	50.00	49.90	49.90	55.50	56.00
Silica - -	11.61	13.26	10.15	9.67	15.76	12.05	4.45	10.69
Manganese, -	.18	.11	.14	2.96	.39	.25	.29	.09
Phosphorus -	1.64	2.78	.65	.68	.18	.95	1.07	.18

"The average of the eight is as follows: Iron, 51.70; Silica, 10.95; Manganese, .55; Phosphorus, .70.

"In regard to these results it remains to be said that so far as the first three elements are concerned we have nothing to ask. *The Potts Creek ores will certainly give a larger yield of iron than any of the Oriskany ores now worked in Virginia.* They can be depended upon for nearly fifty per cent. of iron. One sample is seen to contain an exceptional amount of manganese, but even this is scarcely outside

the allowable limits. In any case, it would be easy to exclude this phase of the ore in mining.

"There remains to be considered the last of the constituents reported in our analyses, viz., phosphorus. It would be too much to expect that all possible advantages should be concentrated in a single district, and accordingly we find by examination of the foregoing analyses that some of the Potts Creek ores run higher in phosphorus than is to be desired. Excluding, however, a single sample (No. 2) from the list above given, the average of the seven remaining samples is .574.

"When account is taken of the high percentage of iron that these ores carry, it is obvious that they must come within the limits of acceptance. * * *

"I must not fail to call attention to the splendid showing of the Upper Bennett bank (No. 8) in the table of analyses. *The finest outcrop of brown hematite in Virginia is at the same time the richest and purest ore of its class.*"

Of the same ores Prof. A. S. McCreath, a Pennsylvania geologist, says:

"These ores may be classed as Brown Hematite, which are hydrated oxides of iron. But the proportion of chemically combined water varies considerably, and they may be said to vary between the extremes of a true Limonite with 14.40 per cent. combined water, and Red Hematite with theoretically no combined water. *So far as the percentage of iron is concerned, the ores are all of high grade, and many of them equal the very best brown ores that are mined.*"

The ores thus described in the pamphlet above referred to lie in the counties along the southern border of West Virginia, while northward through all the border counties of the State the same varieties of ore may generally be found. In subsequent portions of this work where the counties are taken up separately and described, more full descriptions of the iron ores of those localities will be found. The red fossiliferous ore, which is found in large deposits in some of the north-eastern counties, is a valuable ore, comparing most favorably with the ores of more successful and more noted iron regions of the country.

While most of the best and most valuable iron ores are found along the eastern border of the State, they are not all found there,

for to the westward throughout most of the counties of the State ores of greater or less value are to be found. The western border counties do not seem to have much iron, but through the center of the State to the eastward the ores are plentifully scattered. Through the central part of the State in the coal measures two kinds of ores are found—carbonates of iron and black band ores. Speaking of the former, Prof. M. F. Maury says: "Under this head may also be classed the brown hematites of the coal measures, as they are merely the results of the decomposition of the carbonates, and in fact, when a seam of the former is discovered, we may expect it to turn into the latter as soon as we go far enough under ground to get beyond atmospheric influences.

"We see the result of this decomposition in the pieces of Brown Oxide that are found on the hills in every portion of the State. These have led to many erroneous ideas as to the richness of certain localities in this mineral, which came originally from the carbonates of iron existing in the beds that were once superimposed upon the present strata, and have long since been worn away by erosion. As this took place, the lighter materials were washed off by the currents, while the heavier ore settled down and was left resting on our hill sides. Sometimes a great deal was deposited in one place, and the soil is full of it, while in others but a single lump was left, and hence it is that on many of our mountains we find the 'blossom' of good ore, and yet have no bed of it near by."

Of the black band ore, a very valuable ore, found in the central to the south-western part of the State, principally south of the Great Kanawha river, Prof. Maury says:

"This is nothing more than a carbonate of iron, of a more or less black color, by reason of an admixture of bituminous matter. So far as yet known, it is confined entirely to the southern part of the State, where it has been discovered only within the last few years. From the fact of its very often resembling black slate in its structure, it may often have been passed over unnoticed, and careful search will no doubt show it in many places, where it is not now suspected.

"It is a class of material that makes an excellent iron, and from which much of the celebrated Scotch-pig is smelted. It possesses an especial value, from the fact that, in many cases, a low grade ore

can be roasted into a higher grade. For instance take that from Davis Creek, in Kanawha county. When mined, it contains 33 per cent. of metallic iron, and 26 per cent. of carbonaceous matter. By piling it in heaps, and setting fire thereto, the carbonaceous matter is burnt out, and in the process of combustion, generates enough heat to convert the carbonate of iron in the ore into a richer oxide, so that the mass, after being thus roasted, analyzes 65 per cent. of metallic iron.

"Unfortunately, we can never reckon or depend upon any seam of it continuing of a uniform value, for in one place it will contain an ore well worth working, while half a mile off it may become so mixed with slate or earthy impurities as to be utterly valueless. As an example: On Bell creek, Fayette county, an excellent bed about 4 feet thick was found by Mr. L. Bemelmans, of Charleston. Some 2 or 3 miles from this place, up a ravine a short distance below the mouth of Bell, the same seam showed only 12 to 14 inches of the good material, while on Little Elk run, of Gauley river, some three miles to the north, the results of two analyses from the same seam gave only 5 and 7 per cent. respectively of metallic iron. If we search for it in another direction, it may open to a very valuable deposit. From this irregularity and from the fact that it has been well proven in this field, it will be readily understood that careful search may find it in many places where it has never yet been noticed, and wherever it is found in workable quantity its presence adds great value to the land."

Otto Wuth, of Pittsburg, who made an analysis of some black band ore found in Kanawha county, says: "Thoroughly roasted, it would then contain about 65 per cent. of metallic iron, while there is more than enough carbonaceous matter to roast it. I consider it a black band ore of the first quality."

Analyses of the iron ores taken from various counties of the State will be shown in the following table:

KIND OF ORE.	County.	Metallic Iron.	Phosphorus.	Sulphur.	Silica.	Manganese.	AUTHORITY.
Carbonate.....	Mineral	38.42					Prof. W. B. Rogers
"	and	34.29					"
"	Grant	38.28					"
"	"	33.17					"
"	Preston	44.43					"
"	"	39.87					"
"	"	46.67			24.96		"
Average of various Samples.	"	32.52	0.66	0.13			"
Carbonate.....	Monongalia	31.86	0.23	0.15			C. E. Dwight.
"	"	34.69	0.31	0.12			"
"	"	49.69	0.19	0.13			"
"	"	41.94	0.16	0.20			"
"	"	41 35	0.87	0.30			"
"	"	40.71	0.27	0.22			"
"	"	30.24	0.30	0.33			"
"	"	44.95					Prof. Rogers.
"	"	43.04					"
"	Taylor	38.91	0.29	0.05			C. E. Dwight.
"	"	35.98	0.20	0.48			"
"	"	39.10	0.23	0.42			"
Brown Hematite..	Raleigh	55.54	0.81	0 35			"
Fossil.....	Greenbrier	59.23					J. B. Britton.
Pipe.....	"	61.75					"
Hematite.....	"	57.17					"
Bluff Ore.....	"	36.69					"
Brown Hematite..	"	44.42	.13	.73			C E. Dwight.
Red Fossiliferous.	"	56.23	.58	.42			"
Red Hematite.....	"	56.58	.012	.169			"
Red Fossiliferous.	Hardy	59.36	.69	.04			"
Red Hematite.....	"	51.09	.05	.03			"
Brown Hematite.	"	62 01	.16	.04			"
Red Fossiliferous	Grant	52.52	.88	.09			"
Brown Hematite..	Hampshire	51.47	.10	.48			"
"	"	52.67	.03	.82			"
"	Monroe	58.83	0.44		2.82	0.21	Hy. Froehling.
"	"	58.40	0.71		3.60	0.74	"
"	"	48.50	1.02		17.67	0.27	"
"	"	57.11	0.71		6.23	0.08	"
"	"	51.95	0.59		14.85		"
"	"	50.22	1.04		15.34	0.14	"
"	"	45 92	0.66		21.20	0.10	"
"	"	52.09	1.25		12.74	0.11	"
"	"	51.80	1.06		13 02	0.10	"
"	Pendleton	57.10	.438		3.64		W. H. Boggs.
Red Fossiliferous.	"	55.15	.542		7.31		"
Manganetic.....	"	.588	.292		19.11	40.78	"

COKE.

Analyses and tests show that the coke of West Virginia is superior to that of Pennsylvania, which for so long a time held the highest place in the markets of the United States. Statistics show that there is more coking coal in West Virginia, many times over, than there is in Pennsylvania, and that in the production of coke West Virginia ranks next to Pennsylvania. With the best coking coal in the United States, if not in the world, and more of it than in any other State, and with a rapidly growing demand for coke, the fact is readily seen that West Virginia must soon become one of the greatest coke making centers in the world. Already there are no less than four large coking districts in the State in active operation, producing annually enough coke to make the State even now among the largest coke producing States of the Union. But few years ago the production was almost nothing. Last year the State produced almost a million and a half tons of coke. The growth of the coke-making industry in the last twelve years is shown in the following table:

YEARS.	No. of Ovens.	Ovens Building.	Coal Used.	Coke Produced.	Total Value of Coke at Ovens.	Value of Coke at Ovens per Ton.	Per cent. of Yield of Coal in Coke.
1880	631	40	206,034	121,715	$ 318,797	$ 2 30	60.0
1881	689	189	272,163	161,058	429,571	2 30	61.0
1882	878	84	321,625	202,103	520,437	2 26	63 0
1883	962	43	360,664	225,893	563,490	2 19	63.0
1884	1,005	127	385,588	228.472	425,952	1 91	62.0
1885	1,078	63	415,533	260,571	485,188	1 86	63.0
1886	1,154	317	425,002	264,168	513,843	1 94	62.0
1887	2,080	442	698,327	442,031	976,732	2 21	63.3
1888	2,137	68	786,139	499,985	.....	.....	63.6
1889	2,453	142	562,739	360,716	.....	.....	64.1
1890	3,442	184	1,377,299	892,490	.....	.....	64.8
1891	4,117	777	1,899,122	1,238,418	.....	.....	65.21
1892	5,490	777	2,011,668	1,313,449	.....	.....	65.29

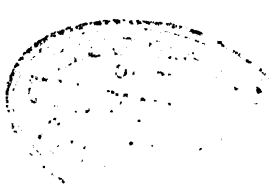
The regions of the State which now produce the greatest amount of coke each year are those along the Monongahela river near Fairmont, where the Pennsylvania coal fields extend up into West Virginia, and where last year a quarter of a million tons were made; the great New River and Upper Kanawha district, which extends for nearly a hundred miles south-east from Charleston, and last year produced 682,527 tons of coke; and the Pocahontas region, in the extreme south of the State, yielding in the last year from Mercer and McDowell counties 282,687 tons. It is in this latter region that the increase is now most rapid.

The table just preceding shows a marked and constant increase in the percentage of coke yielded by the coals. This is due to the improved methods constantly being adopted in its manufacture. Many and valuable have been the improvements in the method of making coke since first it became an important industry in the State, and now the figures show that in its making but little over a third of the coal is lost or wasted. In fact the refuse is put to use and very little of the whole is lost except the smoke. Wherever proper coals are found coke making proves more profitable than the sale of coal, and now there are some 6,000 coke ovens in blast in the State, giving employment to over 1,500 men, besides those who get out the coal which goes to make the coke. Long rows of blazing ovens, shedding their lurid light the landscape o'er, line almost every railroad track that passes through the State and pour their clouds of smoke on high to hide the mountain tops and dim the sky.

In high percentage of fixed carbon, low percentages of ash and sulphur, and freedom from water and phosphorus the cokes of West Virginia stand pre-eminent.

A previous chapter shows the extent and distribution of the coking coals of West Virginia, and the following table will show the analyses of the cokes now made in different sections of the State, as compared with those made in other States and foreign countries:

COLLIERY.	Location.	Fixed Carbon.	Volatile Matter	Ash.	Water.	Sulphur.	AUTHORITY.
Cedar Grove	Kanawha	95.02		4.40		0.58	M. A. Scoville.
East Bank	"	89.95		9.13		0.378	.....
Powellton	Fayette	93.25	1.50	5.15	1.10		Hy. Froehling.
Great Kanawha	"	95.86		3.62		0.51	A. S. McCreath.
Crescent	"	90.31	1.77	7.92		0.59	J. W. Mallett
Eagle and St. Clair	"	90.48		9.09		0.50	Porter and Going.
Nuttallburg	"	93.00		6.76		0.27	C. E. Dwight.
Echo	"	97.71	0.14	1.86	0.29	0.56	J. B Britton.
Caperton	"	94.62	0.24	4.91	0.23	0.54	"
Fire Creek	"	91.94	0.49	6.92	0.10	0.53	A. S. McCreath.
Stone Cliff	"	89.66	2.68	6.60	0.06	0.66	Heager & Wickham.
Quinnimont	"	93.85		5.85		0 30	J. B. Britton.
Echo	"	92.73	0.71	5.15	1.41	0.58	Heager & Wickham.
Pocahontas	Mercer and McDowell	92.58	0.49	6.04	0.19	0.67	McCreath and d'Invilliers.
Pocahontas No. 3.	"	92.24	0.71	6.28	0.18	0.56	"
Stephenson and Mohler	"	92.81	1.05	4.91	0.66	0.54	"
Clements	Marion	87.50		11.00	0.30	1.20	A. S. McCreath.
Montana	"	89.85	.90	8.40	.76	0.82	"
Monongah	"	91.08	1.85	6.17	.24	.66	"
Austen	Preston	87.98		11.57	0.45		P. B. Wilson.
Davis	Tucker	90.60	1.49	6.96	.18	.77	.....
Thomas	"	90.05	1.16	7.94	.15	.70	J. W. Powell.
Bradford	Connellsville	89.57		9.11		.82	A. S. McCreath.
Caperton	Pennsylvania	89.15		9.65		1.20	B. Crowther.
Seymour	Blossburg, Pa.	84.76		13.34		.998	A. S. McCreath.
Holmes & Bro.	Beaver Co., Pa.	84.72		12.63		1.99	"
Pratt Bed	Alabama	88.87	0.75	8.99	0.19	1.18	McCreath and d'Invilliers.
Dade Mines	Georgia	75.91	1.09	21.75	0 54	0.67	"
Etna "	Tennessee	85.45	1.10	11.08	0.85	1.45	"
Bromney	England	91.58		6.86			Bell.
Mons	Belgium	91.30		6.20			DeMaisilly.
Westphalia	Germany	85.06		0.40			Mueck.



EDUCATION.

BY B. S. MORGAN, EX-STATE SUPERINTENDENT OF FREE SCHOOLS.

The educational advantages offered by the State comprise an excellent system of public schools, six State Normal schools, a State University, an institution for the higher education of the colored people, a reform school, a school for the Deaf and the Blind, and numerous private and denominational institutions.

FREE SCHOOLS.

The people of West Virginia have always manifested a deep interest in public education, and long before the organization of the State, a number of counties under special acts of the mother State had established systems of free schools.

The present efficient system of public schools rests upon the following constitutional requirement: "The legislature shall provide by general law for a thorough and efficient system of free schools." The Constitution, however, does not limit the State in its encouragement of education to a system of free schools, but requires the Legislature "to foster and encourage moral, intellectual, scientific and agricultural improvement, and when it may be practicable, to make suitable provision for the blind, mute and insane, and organize such institutions of learning as the best interests of general education in the State may demand." That these requirements have also been met by the Legislature in a spirit of liberality, will appear from the ample provisions made for higher education in the Normal schools and the State University, the State Reform School, and the

institutions for the education of the deaf, dumb and blind, and for the care of the insane.

The law establishing the free school system was passed December 10, 1863, and was put into operation just as rapidly as practicable. The system has steadily grown in popularity and increased in efficiency until it will compare very favorably with those long in operation in the older States.

The law was re-enacted in 1873, with such improvements as the practical working of the system had indicated to be necessary; and this law, with some slight amendments made from time to time, constitutes the present school law.

ADMINISTRATION AND PLAN OF SYSTEM.

In the organization of the free school system the existing political divisions have been used as far as practicable. Every magisterial district in each county is made a school district, which is divided into as many sub-districts as may be necessary for the convenience of the schools therein.

The regular civil, county and State officers collect and in part disburse the school revenues.

The officers charged with the administration of the free school system are:

(1.) District boards of education.
(2.) Sub-district trustees.
(3.) A county superintendent of free schools.
(4.) A State superintendent of free schools.

The general control of the schools of each district is placed in the hands of a board of education, composed of a president and two commissioners elected by the people, which is made a corporation capable of suing and being sued, of contracting for and buying and selling property for the school purposes of the district. The school year begins the first of July, and the board is required to hold its first meeting on the first Monday in July.

The principal duties of the board are to lay the school levies, determine the number of sub-districts, locate and build the school houses, supply them with furniture and appliances, fix the salaries of teachers, transact the financial interests of the district and exercise

a general supervision over all the educational interests of the district.

The trustees of each sub-district serve three years and are appointed by the boards of education. They have charge of the school or schools in their respective sub-districts, appoint the teachers, purchase fuel, see that the school house is kept in repair and proper condition and exercise immediate control over the educational interests of the sub-district.

The county superintendent, who is required to be a person of temperate habits, and skill and experience in the art of teaching, is elected by the people and serves for a term of two years. His duties are to distribute the State school fund to the several districts, distribute the school blanks to boards of education, encourage and attend county institutes, to act as president of the county board of examiners, and keep a register of teachers certificates, visit the schools of his county at least once each year, and report the condition of the schools to the State Superintendent.

The State Superintendent is elected by the people, and serves for a term of four years, and is required to reside at the capital. The law requires that he shall be "of good moral character, of temperate habits, of literary acquirements and skill and experience in the art of teaching." He receives a salary of $1,500, paid out of the general school fund. He exercises a general supervision over the free school system and is charged with the preparation and distribution of all school blanks, the apportionment of the State school fund, and the organization of teachers' institutes. It is his duty also to collect the school statistics and make an annual report to the Governor of the condition of the school system.

There is a County Board of Examiners for each county, composed of two experienced teachers appointed by the presidents of the district boards of education, at a meeting held for that purpose in July of each year, and the county superintendent, who is ex-officio president of the board, which is authorized to issue three grades of teachers' certificates. The first grade is valid for a period of four years, the second grade for two years, and the third grade for one year.

There is also a State Board of Examiners, consisting of four competent teachers appointed by the State Superintendent, which is authorized to issue two grades of certificates, valid throughout the

State, the first grade being granted for a period of twelve years, and the second grade for a period of six.

No person is authorized to teach under the general school law, who has not been licensed by one of these boards.

REVENUES FOR THE SUPPORT OF THE FREE SCHOOL SYSTEM.

The Constitution has made the following provision for the creation and management of an invested or permanent school fund: "The existing permanent and invested school fund, and all money accruing to this State from forfeited, delinquent, waste and unappropriated lands; and from lands heretofore sold for taxes and purchased by the State of Virginia, if hereafter redeemed or sold to other than this State; all grants, devises or bequests that may be made to this State for the purposes of education or where the purposes of such grants, devises or bequests are not specified; this State's just share of the literary fund of Virginia, whether paid over or otherwise liquidated; and any sums of money, stocks or property which this State shall have the right to claim from the State of Virginia for educational purposes; the proceeds of the estates of persons who may die without leaving will or heir, and of all escheated lands; the proceeds of any taxes that may be levied on the revenues of any corporations; all moneys that may be paid as an equivalent for exemption from military duty; and such sums as may from time to time be appropriated by the Legislature for the purpose, shall be set apart as a separate fund, to be called the "School Fund" and invested under such regulations as may be prescribed by law, in the interest-bearing securities of the United States, or of this State, or if such interest-bearing securities can not be obtained, then said "School Fund" shall be invested in such other solvent interest-bearing securities as shall be approved by the Governor, Superintendent of Free Schools, Auditor and Treasurer, who are hereby constituted the "Board of the School Fund," to manage the same under such regulations as may be prescribed by law; and the interest thereof shall be annually applied to the support of free schools throughout the State, and to no other purpose whatever. But any portion of said interest remaining unexpended at the close of a fiscal year shall be applied to and remain a part of the capital of the "School Fund:" *Provided*, that all taxes which shall be received by the State upon

delinquent lands, except the taxes due to the State thereon, shall be refunded to the county or district by or for which the same were levied."

The constitution also requires that "the Legislature shall provide for the support of free schools, by appropriating thereto the interest of the invested "School Fund," the net proceeds of all forfeitures and fines accruing to this State under the laws thereof; the State capitation tax, and by general taxation of persons and property or otherwise. It shall also provide for raising in each county or district, by the authority of the people thereof, such a proportion of the amount required for the support of free schools therein as shall be prescribed by general laws."

In carrying out this provision the school law provides "that for the support of free schools there shall be a State tax levied annually, of ten cents on the 100 dollars valuation of all real and personal property of the State," which with the interest on the school fund, and the amounts received from capitations, forfeitures and fines, form the State fund which is annually distributed to the several counties.

The school law also provides that district boards of education "Shall annually levy by the authority of the people such a tax on the property taxable in the district, as will, with the money received from the State, be sufficient to keep such schools in operation at least four months in the year; *provided* the said tax in any year shall not exceed the amount of fifty cents on every one hundred dollars valuation. The amount of this levy and the fund received from the State tax constitute the "Teachers' Fund," and is used only in paying teacher's salaries.

To provide school houses, grounds, furniture, fuel, &c., &c., the district boards are required to lay an annual levy not to exceed forty cents on the one hundred dollars valuation of all property. The amount secured by this levy constitutes a "Building Fund," and can be used only for those purposes named above.

The school law has made provision for three grades of free schools, primary, graded and high schools. It is the duty of the board of education to establish at least one primary school in every sub-district. Graded schools may be established by the board on its own authority in towns, villages and densely populated neighborhoods;

but before a public high school can be established, the question must be submitted to a vote of the people and receive not less than three-fifths of the votes cast. The number of schools of all classes reported in the State Superintendent's report for the year ending June 30, 1892, was 5,167.

In the primary and graded schools the branches of learning required to be taught are, orthography, reading, penmanship, arithmetic, English grammar, history, geography, physiology, single entry bookkeeping and civil government. These branches are arranged in a graded course of study, which prescribes the order in which the several branches shall be taken up and studied, and the time to be devoted to them respectively, with provision for advancement from class to class, also for examination and graduation of all pupils who satisfactorily complete the prescribed course. This course of study is accompanied by a manual of instruction prepared by the State Superintendent, which is intended for the general guidance of the teacher in the discharge of his duties.

The school law seeks to secure proper moral instruction, and "all teachers, boards of education, and other school officers are charged with the duty of providing that moral training for the youth which will contribute to securing good behavior and manners, and furnish the State with exemplary citizens."

SPECIAL OR INDEPENDENT SCHOOL DISTRICTS.

Under special acts of the Legislature the larger towns of the State have been cut off into separate districts, and made independent for school purposes of the magisterial district or districts of which they formed a part. This course has been found necessary in order to provide these rapidly growing towns with adequate educational facilities.

As early as 1849 the city of Wheeling was made an independent school district, and was continued as such when the first free school law was passed by the State. Since the organization of the free school system forty-five more special districts have been established, and under the larger powers granted them for taxation and other school purposes these districts have been enabled to build splendid modern school buildings and provide in addition to primary, thorough graded and high school facilities.

Among the towns that may be noted as having made special advancement in the improvement of their public schools, are Wheeling, Parkersburg, Huntington, Charleston, Martinsburg, Fairmont, Clarksburg, Grafton, Wellsburg, Moundsville, Morgantown, Piedmont, Keyser and Bucklhannon.

No other State has made a more marked public school growth than West Virginia. Beginning with 133 school houses and 387 teachers in 1865, the State Superintendent's report for 1892, shows a total of 5,004 houses, and 5,747 teachers. The total value of school property in 1865 was $52,856, and in 1892 it was $2,746,234.

The average school term throughout the State for 1892, was five months and a half. The statistical tables appended hereto, compiled from the latest report of the State Superintendent, (1892), show the most important statistics connected with the history of the free school system, since its organization, such as the enumeration, enrollment, and daily average attendance of school youth, for each year, the number of schools and school houses, the value of school property, the amounts of the general and invested school fund each year, and the amount expended each year on building fund and teachers fund. These tables make a record of progress of which any people might justly be proud.

YEAR.	Number of Districts.	Number of Sub-Districts.	Numb'r of School Houses.	Number of Schools.	Number of Teachers.	Enumeration of Youth.	Number Enrolled.	Average Daily Attendance.
1865	.....	.....	133	431	387	63,458	15,972	7,761
1866	.....	.....	412	935	937	118,607	34,219	13,037
1867	.....	1,517	702	1,143	1,222	115,340	35,304	20,288
1868	.....	1,825	1,306	1,756	1,810	130,893	53,724	30,566
1869	.....	2,380	1,618	2,198	2,283	151,848	73,111	69,463
1870	.....	2,567	2,113	2,516	2,405	162,432	87,330	55,083
1871	.....	.....	2,059	2,323	2,468	172,337	76,999	51,336
1872	.....	.....	2,216	2,546	2,645	153,916	85,765	56,317
1873	.....	.....	2,612	2,857	3,082	171,793	81,100	61,244
1874	.....	.....	2,830	3,021	3,345	175,612	110,530	69,908
1875	310	2,634	2,959	3,233	3,461	179,897	117,846	76,468
1876	356	3,124	3,137	3,343	3,693	184,760	125,504	72,278
1877	.....	.....	3,216	3,390	3,789	192,606	125,332	83,469
1878	.....	.....	3,297	3,511	3,747	301,237	130,184	86,768
1879	361	3,383	3,479	3,725	4,131	206,123	135,526	90,268
1880	363	3,529	3,557	3,811	4,134	210,113	142,850	91,704
1881	365	.....	3,704	3,912	4,287	213,191	145,203	91,266
1882	370	3,779	3,839	4,028	4,360	216,598	155,544	96,652
1883	375	3,855	3,945	4,116	4,455	220,980	160,904	98,190
1884	378	3,887	4,097	4,254	4,643	228,185	166,272	102,012
1885	372	4,035	4,159	4,078	4,811	236,245	166,257	105,904
1886	373	4,142	4,260	4,437	4,925	242,752	179,501	103,214
1887	374	4,288	4,465	4,603	5,089	248,178	172,257	108,293
1888	377	4,302	4,567	4,819	5,238	256,360	189,251	122,020
1889	384	4,549	4,655	4,868	5,341	254,934	187,528	119,990
1890	383	4,651	4,814	4,784	5,491	266,326	193,064	121,700
1891	377	4,755	4,899	5,026	5,600	271,334	198,376	123,987
1892	378	4,866	5,004	5 167	5 747	276,452	200,789	188,044

YEAR.	Value of houses, lands, &c.	The School Fund.	General School Fund.	Cost of Education based on Enumeration.	Amount Expended on Building Fund.	Amount Expended on Teachers' Fund.	Total cost of Education.
1865	$ 52,856	$ 106,122 78	$ 67,348 96	$	$	$	$ 7,722 90
1866	322,946	88,772 55	195,562 16	.....	.....	.....	172,734 00
1867	375,822	172,023 15	175,394 24	2 82	.....	.....	324,517 31
1868	693,677	208,397 37	183,496 68	4 00	244,386 67	277,465 77	520,852 44
1869	945,621	216,761 06	149,568 58	3 12	246,470 96	329,152 73	576,623 69
1870	1,012,932	229,300 00	233,139 02	2 90	207,267 66	262,891 77	470,129 43
1871	1,064,717	278,069 92	174,896 35	3 35	212,033 51	365,685 21	577,718 72
1872	1,164,578	284,717 18	237,215 88	3 48	124,791 42	411,945 18	536,736 60
1873	1,401,655	316,152 31	231,435 02	3 53	150,880 95	456,110 23	606,991 18
1874	1,540,460	315,320 48	214,791 32	4 14	224,537 02	480,430 84	704,767 86
1875	1,605,627	325,243 34	209,124 38	4 24	255,233 29	508,579 19	763,812 45
1876	1,660,467	339,987 97	207,263 98	4 25	247,630 45	544,035 15	786,117 94
1877	1,714,599	344,531 45	195,183 75	4 00	209,740 50	539,273 32	770,658 86
1878	1,688,349	354,811 48	251,414 50	3 33	180,113 70	501,764 61	681,848 31
1879	1,676,871	375,154 52	220,233 54	3 44	204,874 55	504,196 35	709,071 30
1880	1,670,534	423,988 85	221,616 38	3 37	185,069 67	522,483 24	707,552 89
1881	1,753,143	441,947 25	183,783 88	3 56	212,877 56	539,647 69	758,475 22
1882	1,823,987	474,305 11	272,842 33	4 00	265,074 84	600,203 57	865,878 41
1883	1,841,661	504,461 26	252,529 90	4 27	302,254 49	645,116 48	947,370 97
1884	1,871,235	514,159 33	218,208 53	4 32	305,567 83	691,863 58	997,431 46
1885	1,979,847	549,258 00	164,520 50	4 42	324,188 46	719,080 60	1,043,269 06
1886	1,964,945	570,473 18	367,724 96	4 27	301,431 10	735,089 36	1,036,020 46
1887	2,041,128	590,493 25	402,396 87	4 36	330,727 84	756,946 86	1,087,744 70
1888	2,045,456	606,462 08	390,561 88	5 62	416,950 59	823,699 32	1,240,649 91
1889	2,330,718	619,962 08	300,168 83	5 07	457,633 99	856,667 04	1,313,701 03
1890	2,483,528	620,011 48	300,431 23	4 89	397,903 31	895,201 67	1,293,164 98
1891	2,151,336	678,203 93	361,487 89	4 69	546,019 83	914,673 71	1,360,693 54
1892	2,746,234	706,025 75	336,389 64	5 16	491,757 05	944,305 50	1,436,062 53

NORMAL SCHOOLS.

The State has in successful operation six normal schools, geographically located so that every section of the State is conveniently accessible to some one of them. Their chief work being the education and training of teachers for the public schools, they really form an essential part of the free school system. In all of them, however, there is established an academic department, in which students may prepare for entrance to college, or for active business.

There was enrolled in these schools, for the year 1892, one thousand and fifteen students.

They are controlled and managed by a board of regents, composed of the State Superintendent, who is *ex-officio* president, and one member from each Congressional district appointed by the Governor, whose service continues during his pleasure.

The board has full authority to adopt and establish such by-laws, rules and regulations for their government, as it may deem necessary; to appoint and remove teachers and fix their salaries; to prescribe the preliminary examination of pupils, and the terms on which they shall be received and instructed and the branches of learning to be taught in each department; to determine the number of pupils to be received in the normal department from each county and the mode of selecting them.

It is the duty of the State Superintendent to prepare suitable diplomas to be granted to the students of the normal department who have completed the prescribed course of study.

The board is required to appoint three persons, residents of the county in which each school is located, who shall constitute a local executive committee for the care and management of each school, subject to the rules and regulations prescribed by the board.

The Rules and Regulations of the Regents, published in 1891, contains the following in regard to the management of these schools:

One thousand normal pupils, with free tuition, are entitled to attend the six schools, apportioned among the several counties, according to the census of 1890, as follows: Barbour 12, Berkeley 17, Braxton 5, Boone 9, Brooke 6, Cabell 13, Calhoun 6, Clay 3, Doddridge 10, Fayette 11, Gilmer 7, Grant 5, Greenbrier 15, Hampshire 10, Hancock 5, Hardy 6, Harrison 20, Jackson 16, Jefferson 15, Kanawha 32, Lewis 13, Lincoln 8, Logan 7, Marion 17, Marshall

18, Mason 22, Mercer 7, Mineral 8, Monongalia 15, Monroe 11, Morgan 5, McDowell 3, Nicholas 7, Ohio 37, Pendleton 8, Pleasants 6, Pocahontas 5, Preston 19, Putnam 11, Raleigh 7, Randolph 8, Ritchie 13, Roane 12, Summers 8, Taylor 11, Tucker 3, Tyler 11, Upshur 10, Wayne 14, Webster 3, Wetzel 13, Wirt 7, Wood 25, Wyoming 4.

Application for appointment to the normal department must be made to the principal of the school or to the county superintendent of the county in which the applicant resides. Male pupils must not be less than fourteen years of age, and females not less than thirteen. Each applicant must obligate himself to teach at least one year in the free schools of the State, or refund the amount of the tuition fees paid by other pupils while under instruction.

Two departments, a normal and an academic have been established in each school. The normal course consists of three years, viz. junior, middle, and senior. The Junior year embraces Orthography, Reading, Writing, Arithmetic, Geography, Language Lessons and Elementary English Grammar, U. S. History and Physiology.

The Middle year embraces: Orthography by written exercises, Reading, Sentence Analysis, Rhetoric and Composition begun, Physical Geography, Algebra to Quadratics, Elements of General History, Pedagogy, Theory and Practice of Teaching, School Law, Ancient and Modern Languages optional.

The Senior year embraces: Spelling, English Literature, Rhetoric, Algebra, Plane Geometry and Trigonometry, Elements of Physics, Natural History, Botany, Civil Government, Drawing, Book-keeping, Psychology and History of Education.

There are regular exercises in composition and declamation throughout the course, and frequent exercises in hearing classes recite, methods discussed, school organization exemplified, &c., &c.

Diplomas are conferred upon the graduates, and this diploma entitles the holder to receive a State certificate after having taught three years on a first grade county certificate.

The Academic Course of Study consists of two years, Junior and Senior.

The Junior year embraces: Geography, Arithmetic, English Grammar, Latin Lessons, Reader and Grammar, Physiology and Hygiene.

The Senior year embraces: Algebra, Book-keeping, U. S. History Cæsar (two books), Cicero (three orations) Virgil (three books), Æneid, Latin Grammar, Greek, First Lessons, Reader, Grammar, Xenophon (two books), or German.

The Principal is authorized to issue to the student completing this course a CERTIFICATE which will be received at the State University as equivalent to its Preparatory Course.

The school year consists of forty-two weeks, divided into three terms. The rate of tuition for pay scholars is as follows:

Junior Normal Course, per year	$ 20 00
Middle or Senior Normal Course, per year	24 00
Academical Department, per year	24 00
Incidental Expenses for all Students, per session or fraction thereof	1 00

There were one thousand and fifteen students enrolled in the six schools during the year 1892, and seventy-two graduates. The total number enrolled since the schools were opened is 13,971, and the number of graduates is 1,125.

The majority of these students and graduates have become successful teachers, and the efficiency and advancement of the free school system has been due in a large degree to the good work performed by the Normal Schools.

The total amount expended by the State for the purchase of ground and the construction of buildings, and for repairs, furniture, libraries, apparatus and fuel for the several Normal Schools up to September 30th, 1892, is $145,802.

BRIEF DESCRIPTION OF THE STATE NORMAL SCHOOL AND THE SEVERAL BRANCHES.

MARSHALL COLLEGE, THE STATE NORMAL SCHOOL.—Is located at Huntington, in Cabell county, and was established in 1867 The buildings are ample for the accommodation of at least three hundred pupils, with dormitories for about one hundred. The grounds occupied by the institution consist of seventeen acres situated almost within the heart of the city, and fronting on two of the principal streets. Excepting those occupied by the State University, these are the most beautiful and ample school grounds in the State. The

institution has a well selected library of several hundred volumes, which receives an annual appropriation from the State, and a good working equipment of chemical, physical and philosophical apparatus.

The enrollment for 1892 was 183, and the number of graduates 8. The present Principal is Thos. E. Hodges.

FAIRMONT BRANCH OF THE STATE NORMAL SCHOOL – Is located at Fairmont, in Marion county. This school was established in 1868, when the State purchased the grounds and buildings devoted to a private Normal school, and made it a branch State Normal school. The institution has enjoyed uninterrupted prosperity from the day it was opened. Although the original building was enlarged more than once, it was found necessary a few years ago to provide larger and more commodious buildings and grounds The old building and grounds were sold by the State in 1891 to Fairmont Independent Public School district, and a spacious site purchased just outside the corporate limits of the town. The new normal building is one of the best school buildings in the State, and will accommodate at least five hundred students. The school is well supplied with apparatus and has made a creditable beginning toward the collection of a suitable library.

For the year 1892, the number of pupils enrolled was 260 and the number of graduates 27. The present Principal is J. Walter Barnes.

SHEPHERD COLLEGE BRANCH STATE NORMAL SCHOOL.—This school is located at Shepherdstown, Jefferson county, and was opened as a State Normal school in September, 1873. The building occupied by this school is a two-story, commodious brick structure, well arranged for school purposes, and sufficient to accommodate two hundred and fifty pupils. It is beautifully situated on an eminence in the center of the town and surrounded by beautiful grounds. This school is also supplied with suitable apparatus and a library.

The number of pupils enrolled for 1892 was 90, and the number of graduates 7. The present Principal is A. C. Kimler.

GLENVILLE BRANCH NORMAL SCHOOL—Is located at Glenville, Gilmer county, and was opened to students January, 1873. The building in which the school was organized and conducted for several years proved inadequate to the growing needs of the school, and in

1885 the legislature made an appropriation for the erection of a larger and more commodious building.

The school has been well supplied with suitable apparatus, and a library of well selected standard books. The enrollment for 1892 was 107 and the number of graduates 7. The present Principal is Rev. M. D. Helmick.

WEST LIBERTY BRANCH NORMAL SCHOOL—Is located at West Liberty, Ohio county, and was opened for instruction in 1870. The building and grounds occupied by this school were formerly owned and used by the West Liberty Academy, and were purchased by the State in 1870. While this school has suffered some reverses and interruption since its organization, it has on the whole been successful and prosperous, especially is this true during the past seven years. The town is admirably situated for the location of an educational institution. The legislature at its last session made an appropriation for the erection of a new and better building for this school. It is well equipped with suitable apparatus and a good library.

The enrollment for the year 1892, was 130, and the number of graduates 11. The present Principal is Robert A. Armstrong.

THE CONCORD BRANCH NORMAL SCHOOL—Is located at Concord, Mercer county, and was opened for instruction May, 1875. This school has grown and prospered under greater obstacles than any other normal school in the State. The building in which it was organized in 1875, was quite a primitive structure for a State Normal school. In 1885, the legislature made an appropriation for a new building, and in 1887 an appropriation for an addition to this building, and again in 1891 an appropriation for the erection of a boarding house for young ladies. The school in point of attendance has grown to be the second school in the State. It has been well supplied with apparatus and library.

The enrollment for 1892 was 245, and the number of graduates, 7. The present Principal is John D. Sweeney.

WEST VIRGINIA UNIVERSITY.

The West Virginia University, located at Morgantown, Monongalia county, is the head of the State educational system.

This institution had its origin in the grant of lands made by the United States in 1862 to most of the States for the establishment of agricultural colleges. West Virginia received in this way land scrip to the amount of $90,000, which was the proceeds of the sale of 150,000 acres of land. To this the State has since added $20,000, making an endowment fund of $110,000, the income from which alone being used to pay current expenses of the institution.

The act establishing these institutions provided that the interest of this fund should be used for the support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

By the union of State and National funds, it has been possible to carry out the provisions of the act in a broad and liberal spirit. Five splendid buildings for the purposes of the University have been erected, as follows: University Hall, Preparatory Building, Agricultural Experiment Station, Commencement Hall and Gymnasium, and Mechanical Building. A building for the departments of Physics, Chemistry, Civil Engineering and Geology is now being erected. The cost of these buildings, including the scientific building now under construction, is about $175,000.

The revenues for the current support of the University are derived from the interest on the Endowment Fund, the appropriations made by the legislature, and since 1890, by additional appropriations by the Congress of the United States.

The University is under the control and management of a board of thirteen Regents, one from each Senatorial District, appointed by the Governor.

The following departments, or schools, have been established: the Collegiate, Military, Law, Preparatory and an Agricultural Experiment Station.

The Collegiate Department embraces the following groups of study: Agriculture, Ancient Languages, Biology, Chemistry and Physics, Civil Engineering, English, Geology, History, Mathematics, Mechanical Engineering, Mechanic Arts, Metaphysics, Modern Languages, and Political Science.

In the Collegiate Department the following degrees are conferred upon graduates: Bachelor of Arts, Bachelor of Science, Bachelor of Science in Mechanical Engineering, Bachelor of Science in Civil Engineering, and Bachelor of Agriculture. Post graduate courses are also offered for the degrees of Master of Arts and Master of Sciences.

The course of study in the Law Department, covers the branches of common and statute law, constitutional and international law, commercial and criminal law, maritime law, equity jurisprudence, evidence, pleading and practice. Graduates of this department are admitted to practice in any of the courts of the State without examination. Instruction in military science and tactics is given by a graduate of West Point, detailed from the United States army. The United States also furnishes arms and equipments for this purpose. The law provides for the appointment of eight cadets from each Senatorial district, who receive tuition, books and stationery free.

The Preparatory Department has been established for the purpose of preparing young men for admission to the higher classes of the University.

The Agricultural Experiment Station was organized in 1888, and owes its existence to an act of Congress, approved March 2, 1887. The work of the Station, according to the act, is chiefly devoted to researches and experiments concerning agriculture and to the diffusion of the results of such experiments among the people. Since its organization the Station has been under the directorship of John A. Myers, Ph. D.

Tuition is practically free to all students from West Virginia. Young women are admitted to the classes of the Collegiate Department.

The University possesses a library of several thousand volumes of standard books and special libraries and an adequate equipment of apparatus for the special use of the various departments.

The present faculty consists of the President, E. M. Turner, LL. D., and seventeen professors and one assistant professor.

There have been 3,776 students in attendance and 163 graduates in the Collegiate Department and 97 in the law department since the University was opened.

WEST VIRGINIA COLORED INSTITUTE.

This institution, located at Farm, Kanawha county, was established by the State in 1891 to carry out an act of Congress approved August 30, 1890, entitled "an act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of an act of Congress approved July 2nd, 1862."

The location is a most eligible one for the purposes of the school. The grounds consist of thirty acres of Kanawha River bottom land, and the building is a three-story brick structure.

The institution is under the management of a Board of Regents, appointed by the Governor, one from each Congressional district.

The funds for its support are derived from Federal and State appropriations.

The curriculum embraces the following courses of study:

1. A course in pure mathematics; arithmetic, algebra, geometry and trigonometry.
2. A course in the English language.
3. A course in natural and applied science, philosophy and chemistry.
4. A course in practical agriculture.
5. A course in practical mechanics.

A normal department has been established for the normal education and training of teachers.

The Agricultural and Mechanical Departments have been supplied with all necessary apparatus, machinery and tools. Although not yet a year since the insitution was opened to students, its growth and progress has been very satisfactory.

This institution and Storer College afford ample and convenient facilities for higher education to the colored people of the State. The present principal is J. Edwin Campbell.

WEST VIRGINIA REFORM SCHOOL.

This institution, located at Pruntytown, Taylor county, was established under an act of the legislature passed in 1889. It was opened July 21, 1890, for the reception of inmates.

It is exclusively devoted to the reformation and care of male minors (under sixteen years of age), but white and colored inmates are required to be kept separate.

The institution is under the control of a board of directors appointed by the Governor. Boys may be committed by all courts of record for offenses against the law and for incorrigibility and vagrancy.

While under the care of the school, boys are taught some useful trade. At the present time, besides farming, they are taught tailoring, shoe-making and printing. About one hundred and twenty-five boys have been enrolled since the institution was opened. The present Principal is C. C. Showalter.

PRIVATE AND DENOMINATIONAL SCHOOLS.

Besides the foregoing educational institutions, established, controlled and supported by the State, there are some sixteen private and denominational institutions, ranging in grade from the academy and seminary up to the well equipped college; the most prominent among which are the following:

BETHANY COLLEGE—Located at Bethany, Brooke county, in the western Panhandle, and under the control of the Christian Church, was founded in 1840 by the renowned Rev. Dr. Alexander Campbell. This is not a theological school, but a literary college of high grade, and open to both sexes. The grounds are ample, and the college building, over four hundred feet in length, is noted for its artistic beauty. The institution possesses an extensive library and a fine equipment of apparatus.

The matriculates of the college number about six thousand and the graduates between seven and eight hundred, many of whom have achieved distinction in this and other States. The present President is the Rev. Hugh McDiarmid.

BROADUS COLLEGE—Located at Clarksburg, Harrison county, was opened in 1876. At first young ladies only were admitted, but in

1888 it was opened to young men also. The institution is under the general control of the Baptist Church. The curriculum offers four courses of study, Primary, Preparatory, Collegiate and Ornamental.

The number of students enrolled in 1892, was 120.

The main building is a three story brick structure 40 by 70 feet, with boarding accommodations for young ladies. The present President is Rev. R. R. Powell.

NORMAL AND CLASSICAL ACADEMY—Located at Buckhannon, Upshur county, was established in 1882, under the auspices of the United Brethren Church.

The institution has an endowment fund of $15,000, but it is mainly supported by tuition fees and voluntary contributions of friends.

The building is a two-story brick structure of ten rooms. The enrollment for the year 1892, was 176. Since the opening of the school there have been 44 graduates in the Literary Department, 7 in the Musical and 33 in the Commercial.

The present Principal is W. O. Mills.

WEST VIRGINIA CONFERENCE SEMINARY—Located at Buckhannon, was established in 1887 under the auspices of the West Virginia Conference of the Methodist Episcopal Church, and was opened in September, 1890. The institution owns an extensive plat of forty-three acres. The building is a beautiful three-story structure 80 by 106 feet. It has no endowment, but depends for its support upon tuition fees and the contributions of friends. The property is valued at about $60,000. The curriculum covers the usual Classical, Scientific and Literary courses.

Departments in Music and Military Science have been added.

The number enrolled for 1892, was 246. The present President is the Rev. Dr. B. W. Hutchinson.

SALEM COLLEGE—Located at Salem, Harrison county, was established in 1889 under the auspices of the Seventh-Day Baptist Education Society. The school is conducted, however, as an undenominational institution. The support of the school is derived from tuition fees and contributions. In addition to the regular classical

and scientific courses of study, there are Normal and Business Departments. The enrollment for 1892, was about 100. Rev. T. L. Gardner is the present President.

SHELTON COLLEGE—Located at St. Albans, Kanawha county, was opened in 1872, under the auspices of the Baptist church. The present college building, a large two-story brick, was completed in 1875. The course of study does not extend beyond academic or preparatory work. The school is at present under the charge of W. G. Miller.

BARBOURSVILLE COLLEGE—Located at Barboursville, Cabell county, was established in 1888, under the auspices of the Methodist Episcopal Church, South. The school possesses ample and commodious buildings. In addition to the regular classical and scientific courses, there are provided Normal and Business Departments. It has no endowment, but is supported by tuition fees and contributions. The enrollment for 1892 was 153. Prof. R. W. Douthat is the present President of the college.

LINSLEY INSTITUTE—Located at Wheeling, was established in 1814, being named after its founder, Noah Linsley. The institution is a high-grade academy. Instruction in military tactics is given, an officer for this purpose being detailed from the United States Navy by the Government.

The institution is controlled and managed by a Board of Trustees. The enrollment for 1892 was one hundred and twenty-five, and the number of graduates eleven. The present Principal is John M. Birch.

GREENBRIER SEMINARY—Located at Alderson, Greenbrier county, was established by B. E. Goode in 1885. The curriculum of study embraces two departments, a preparatory and collegiate. The school is open to both sexes. This institution, although in operation but a short time, has made an auspicious beginning.

LEWISBURG FEMALE INSTITUTE—Located at Lewisburg, Greenbrier county; established about the year 1810, and STEPHENSON FEMALE SEMINARY, located at Charlestown, Jefferson county, established in 1882, may be noted as schools doing excellent work.

WEST VIRGINIA COLLEGE—Located at Flemington, Taylor county, was established in 1864. The institution is under the control of the Freewill Baptist church. The work of the school is largely devoted to preparatory and normal instruction. The present President is Rev. Thomas E. Peden.

ST. JOSEPH'S ACADEMY—Located at Wheeling, was established in 1865 and is under the charge of the Sisters of St. Joseph. The school is open to young ladies only. For the year 1892 the enrollment was one hundred and thirteen.

MOUNT DE CHANTAL—Located near Wheeling, was founded by Rt. Rev. R. V. Whelan in 1848 In 1865 it was removed to its present beautiful site, about two miles beyond the city limits. It is in charge of the Sisters of the Visitation.

The grounds are extensive, the buildings ample, and provided with all modern improvements. The library contains six thousand volumes. The course of study is wide and thorough.

The institution has enjoyed the reputation for a number of years as a superior school in the department of vocal and instrumental music.

The annual enrollment for several years has averaged about one hundred.

The parish schools of the Catholic Church, at Wheeling, Parkersburg, Grafton, Clarksburg, Benwood, Huntington, Coalburg, Charleston and Coal Valley enrolled for the year 1892, about two thousand pupils.

STORER COLLEGE—Located at Harper's Ferry, Jefferson county, was established in 1868, and named in honor of John Storer, who gave $10,000 toward founding the institution. A farm of one hundred and fifty acres on Bolivar Heights was purchased for the location of the school. In 1868 the Congress of the United States donated to the College four government buildings, formerly used as residences by officers of the Armory at Harper's Ferry. The grounds donated with these buildings together with the purchase of one hundred and fifty acres, form the picturesque site of the institution. Three new buildings have been erected since 1870. Anthony Hall, Lincoln Hall and Myrtle Hall. Anthony Hall contains a chapel, lecture

room, recitation rooms and quarters for the principal's family; Lincoln Hall and Myrtle Hall are used for boarding halls for young men and women.

Although chartered as a college as well as a normal school, the institution has not yet attempted to establish a "college" course. The departments thus far put into operation comprise a preparatory course, a normal course, and an academic course. Within the last few years an industrial department has been established, which is meeting with excellent success. In this department instruction is given in cooking and house keeping, carpentering and typesetting.

The institution is under the control of a board of trustees. Students are admitted "without distinction on account of race, color, sex or religious preferences," but the school is attended only by colored pupils.

The catalogue for 1892 shows an enrollment of 54 pupils in the preparatory department; 186 in the normal and 58 in the academic.

The present principal is N. C. Brackett, who has been in charge since the organization of the institution.

COMMERCIAL SCHOOLS—The Wheeling Business College, at Wheeling, under the management of J. M. Frasher, is the leading school of its kind in the State. It is the outgrowth of the National Business College, established in that city in 1872.

The school is thoroughly equipped with all modern conveniences for giving young men and women a thorough business education and training. The annual enrollment for several years has numbered over two hundred.

THE MOUNTAIN STATE BUSINESS COLLEGE.—Located at Parkersburg, was opened in 1889. This school has been under the successful management of A G. Sine.

Successful commercial schools have been opened also in Clarksburg and Charleston.

EDUCATIONAL PUBLICATIONS AND THE WEST VIRGINIA EDUCATIONAL ASSOCIATION.

The educational papers that have been published from time to time have contributed in no small degree to the advancement of education, by the spread of sound ideas, the elevation of public opinion, the presentation and illustration of new and improved methods of teaching, and the criticism of all unwise educational measures, or ill advised legislation.

There are at the present time two magazines devoted to the general educational interests of the State, the *West Virginia School Journal* and the *Public School Mirror*, and a number of papers published in the interests of the various educational institutions.

The *West Virginia Educational Association* was organized in 1865. It holds annual meetings which are devoted to the discussion of all questions connected with the advancement of education. Among its membership are enrolled a large number of teachers and school officers, and many prominent citizens.

This Association has been instrumental in creating and fostering an organized interest among teachers and the friends of education, and has done much to promote the advancement of sound educational policy.

Those desiring more detailed information than could be given in the foregoing sketch, are referred to State Superintendent Morgan's bi-ennial report for 1891 and 1892, in which will be found a comprehensive history of education in the State.

SALT.

When first the daring pioneers of old Virginia set foot on western soil and crossed the Alleghanies to find and settle and subdue the land that now composes West Virginia, they found the Indians on the banks of the Great Kanawha making salt. In 1753 Mrs. Mary Ingles, the first white woman who ever crossed the Alleghanies, was captured by the Indians and taken across the mountains, down the Kanawha and Ohio rivers to a point near where the city of Cincinnati now is built. After several months spent among the Indians, she made her escape, retraced her steps and finally returned to her friends and relatives east of the mountains. While in the service of the Indians Mrs. Ingles was forced to spend several days at the salt wells, near the present site of Charleston, boiling salt, a supply of which the Indians carried with them on their march. This is the first account of salt being made from brine anywhere west of the Alleghanies, and it is a noteworthy fact that the great grand-son of this same Mrs. Ingles, Dr. John P. Hale, of Charleston, was in after years one of the most extensive salt manufacturers in the State, at a time when fully sixty furnaces were in operation along the Great Kanawha valley.

Before the beginning of the nineteenth century the boiling of salt had been begun and soon became a profitable industry, the pioneers for hundreds of miles around depending entirely on the salt makers in the Kanawha valley for their supply. Primitive methods sufficed for many years, but when the western country became more thickly settled and markets were provided which had to be supplied with all the necessaries of life, the demand became so great that newer methods were adopted and the manufacture of salt on a

very extensive scale became the principal business of the Kanawha valley. On the Great Kanawha the principal salt wells were at the "Kanawha Salines," about five miles above the city of Charleston, but for miles on either side more brine was found by boring, and many furnaces throughout the valley built up an industry that made the country thrive, and gave employment to many hundred men. For many years the manufacture of salt was the principal business of the Kanawha valley, and the region attained a notoriety throughout almost the world, not only for the quantity of salt produced, but also for its quality. None other ever sold for higher prices or was in more general demand than the Kanawha salt which even now successfully competes in market with other salts which are more cheaply made. For pork packing it is particularly in demand, possessing qualities which cannot be dispensed with in the packing of pork, and cannot be found in any other salt. Hundreds of thousands of barrels were annually shipped by river to the lower markets, principally to Cincinnati, the great pork packing center, before the industry began to decline. The discovery of salt in Michigan with the cheap pine fuel close at hand by which the salt could be made cheaper than it was being made here, caused the business to grow less, and gradually decline until now in the entire Kanawha Valley there is but a single furnace making salt. By the use of natural gas found near the furnace the expenses are reduced to a minimum, and for many years this furnace has been in operation making a vast amount of salt every year, much of which is consumed at home, but the greater part of which is sent to Cincinnati. Along the Ohio river in Mason county were also many furnaces for the manufacture of salt. But there, as elsewhere in the State, the profits have decreased until there are now but a few furnaces in that vicinity where salt is ever made. But the industry will not always remain prostrate. In Michigan where the principal competition was located, the cost of fuel is advancing. The destruction of the forests leaves the boiling of salt a more expensive process than it has hitherto been found, and ere long the West Virginia brine with cheap and limitless fuel close at hand, and unexcelled shipping advantages will once again become the source of a great revenue to the regions where it is found. In the Kanawha valley the wells are bored about a thousand feet as an average

depth, and the brine is found in apparently inexhaustible quantities.

From the products of the brine many chemicals are made, such as soda-ash, bromine, bicarbonate of soda, and other chemicals of a similar nature. Soda-ash is largely used in the manufacture of glass, soap, paper, and numerous other articles, and is an important article of commerce. Nearly all the soda-ash used in this country is made in England, over 140,000 tons being imported annually. The cost of making it in England is 87 cents per hundred pounds; the tariff and the transportation charges raise the cost of soda-ash laid down in America to considerably over a dollar a hundred pounds. After a full investigation the late Hon. Henry S. Walker and associates found that in the Kanawha valley salt region with fuel cheap and close at hand the same product can be made for about 80 cents a hundred pounds, showing a large difference in favor of American manufacture.

The supply of soda-ash has been for a long time short of the demand in this country and many glass factories have been, at times, forced to suspend on account of their inability to get it. With a manufactory in this country able to put out all that would be demanded of it, at a lower price than is now paid the foreign manufacturers, there should be no shutting down of glass works or any other works depending on soda-ash for their raw material.

Some years ago a number of Baltimore importers of soda-ash organized a company of English capitalists and had selected the Kanawha valley as the most suitable field in America for the manufacture of soda-ash. But their plans were never matured and the company never went to work. Only a few years ago the late Hon. Henry S. Walker spent several months in England investigating the process of making soda-ash, and had organized another company for its manufacture near Charleston when his sudden and untimely death put an end to all his projects and nothing was ever done by his company. But the fact remains that here in West Virginia is one of the most favorable sites in the world for the manufacture of soda-ash, an article which is largely used in the manufacture of many of the articles of every day use throughout the world. With the salt for the boring, the coal almost for the digging, cheap labor and ample transportation facilities, the cost to make it here would

be much less than that in other countries and a large and profitable business might readily be worked up in an article for which there is almost constant demand, and on which a large profit could be made.

The salt wells of the State, while not at present proving themselves so, are really among the most valuable of the State's resources, and the time will come, as in the past, when they will yield from their abundant stores and cause a revival of an industry which for many years was the principal one within the State. Their products will be used in making soda-ash and other chemicals, and with glass sand, wood pulp, and other materials close at hand, the various products in which the soda-ash is a principal part—such as glass, paper, etc.—will be manufactured here. In her salt water West Virginia has a true source of future greatness.

The Great Kanawha valley and the Ohio valley in Mason county are not the only places in the State where salt is found, but these are the places where it has been principally made. Many of the other counties possess as strong salt water as that which has been mentioned, but in other places little salt has ever been made. The descriptions of the counties in pages following will give the places in which salt is found.

OIL AND GAS.

"In 1775 George Washington visited the Kanawha valley in person and located some very valuable lands for his military services. About eight miles above Charleston he set apart and deeded to the public forever an acre of land near the river, on which was a great natural wonder, then little understood, called a 'burning spring.' For many, many years afterward it was visited by every one who came to or passed through Kanawha, as one of the curiosities of the region. It was simply a hole in the ground which filled with water when it rained, and up through which issued a jet of gas, giving the water the appearance of boiling, and when lighted burned with a bright flame till blown out by high wind."

Such is the brief description, given by Dr. John P. Hale, of the first natural gas ever discovered in America. From the same vicinity gas is still produced to-day and is piped to the furnace of John Q. Dickinson, near Malden, where salt is made by steam from natural gas. At the time referred to the gas was not understood, its value was not known, and it was allowed to escape as freely as it might.

In 1815 Capt. James Wilson, an old Kanawha citizen, and one of the early salt makers of the valley, was boring for salt water. He failed to reach the water at the depth expected, but being of a very determined nature, declared he would reach salt water or bore into hell. Soon after this his men struck gas. The tools were blown out, the gas caught fire and poured its flames far upward from the earth, which seemed to be emitting great volumes of fire. The Captain concluded he had told the truth and had actually bored into the lower regions, and had his workmen stop.

The first natural gas field developed and put to practical use was

that in the northern pan-handle near Wellsburg, where the gas is still in use, though with much smaller pressure than at first. To-day in perhaps half the counties of the State natural gas is known to exist. It often bubbles up through the water and sand along the edge of a water course, and on being lighted gives to the stream the appearance of being on fire. In many parts of the State the gas is utilized for lighting, heating and manufacturing purposes. Its value is depreciated by its apparent uncertainty, in many places the gas having given out after being used for some time.

"Before the war" oil was found in West Virginia in the Burning Springs region in the Little Kanawha Valley, near Parkersburg. It was found in shallow wells, and at the prices charged in those days for it, caused the most intense excitement, scarcely equalled by that in California over the discovery of gold. Towns sprang up, derricks were built and oil wells bored. Money was invested and in many instances lost. In others great fortunes were made. Oil was barreled, floated down the river in rafts, and Parkersburg was made the distributing point from which the oil was shipped by rail or river in almost every direction. The war, with its terrible results, broke up the oil excitement, destroyed the derricks and machinery and for a time broke up the business. But later on it rallied, and has been growing ever since. When, a few years ago, the deep wells were first put down the excitement was for a time renewed. In vicinities where the oil was found the old exciting times were again renewed, and towns sprang up almost in a day. In other places many "wild cat" wells were bored in the vain attempt to find the oil at random. The presence of oil in almost every county in the State is suspected, and in very many of them it has been proven to exist in small quantities, while in some it is found in enormous quantities, making West Virginia the only rival for Pennsylvania as an oil producing State. The Sistersville (W. Va.) field is today the greatest producing oil field in the world. Though many counties contribute to the aggregate oil production of the State, there are but three large-producing fields in the State—the Sistersville field, the Eureka-Belmont field, both along the Ohio river, and the Marion county field in the northern part of the State. In these producing fields, the derricks stand in every yard and street corner, and even the property devoted to religious worship is not free from them.

One small struggling church in an oil town leased its property for an oil well, and now derives enough revenue from the well in its back yard to build a handsome house of worship and still to keep the church treasury well replenished. From these centers pipe lines are constructed to the oil markets and oil is constantly pumped through these pipes, frequently hundreds of miles in length, instead of being shipped by rail.

Prof. I. C. White, the foremost geologist of our State, who knows more of the mineral resources of West Virginia than probably any other man, and who has done more for the development of the oil and other resources, at a banquet given in Charleston two years ago to arouse interest in the then proposed World's Columbian Exposition, delivered the following address on the oil of West Virginia:

The desire to search out new and hidden things is universal. It weds alike the astronomer to his telescope, the chemist to his crucible, the philosopher to thought. Led by this enchantment, men explore the depths of the sea, delve into mountains, and seek to penetrate the earth itself to unveil its hidden mysteries. This all-prevailing impulse is the mainspring of human progress. It led Colonel Drake to drill the historic oil well in the valley of Oil creek, below Titusville, which gave to civilization a new illuminant and to the business world a new industry.

The credit of originating the industries dependent upon oil and natural gas is usually awarded to Pennsylvania. This is not really true. West Virginia, and not Pennsylvania, is the true birth place of both. Right here in this beautiful valley of the Kanawha was natural gas first utilized for manufacturing purposes, thirty years before such use in Pennsylvania, while from the other Kanawha, at Burning Springs, oil was shipped in barrels and a regular traffic in it built up many years before Pennsylvania's first well was drilled.

In fact it was right here in the county of Kanawha (which generally leads the procession in business as well as politics) that drilling tools and the method of casing wells were both invented, without which the oil and gas industry would have been impossible. All honor to the memory of Col. Drake for first conceiving and executing the plan of drilling into the earth to obtain oil. But in this connection let us not forget the names of the Ruffner Brothers,

whose busy brains invented casing; nor "Billy" Morris, who constructed the first pair of "jars," for without both of these discoveries deep drilling would have been impracticable.

The question is frequently asked, why it is that, if West Virginia really contains so much oil, it was not discovered and developed along with that of her sister State. The answer is at hand. The first wells to find oil in our State were on the Little Kanawha, where a great arch in the rocks throws the oil sands much nearer to the surface than elsewhere in the State, and hence it happened that although wells were drilled in nearly every county west from the Alleghanies, none of them, until recent years, penetrated the earth far enough to reach the oil bearing rock.

About eight years ago your speaker took up the serious study of oil and gas problems in Pennsylvania. The following year I became convinced that the great oil belt of that State would extend into and across our own. Acting on this conviction I had a map prepared almost exactly like the one you see here now. This I submitted to a Pittsburgh firm, and the theory of a southern extension of the Pennsylvania field appeared so plausible to them that they were induced to undertake the oil development of West Virginia on a large scale.

Under my direction over four hundred thousand acres of West Virginia lands were leased by my brother, H. S. White, who now does business for the United States. The Pittsburgh syndicate drilled two wells on this immense area, and erected about eight derricks. The first was drilled for gas with which to supply Wheeling. Some gas was found, but not as much as the company expected. The second well was for oil, and located near Board Tree Tunnel at the southwest corner of Pennsylvania. This found only a small quantity of the golden fluid. The syndicate was discouraged. Its President declared there was neither oil nor gas in West Virginia, and bankruptcy would be the result of any further effort to find them. The "shut down" movement came on and a property which would have made Rockefellers of its owners was permitted to lapse and the leases to become void. Within sight of the Board Tree venture a valuable oil well was completed by the Standard Oil Company during the past year.

One of my locations, made in 1885, before Mr. Hukill had drilled

his first well at Mt. Morris, was one on the Youst farm near Fairview, in Marion county. Here a derrick had been erected, and I plead with Pittsburgh men to make this test before finally abandoning West.Virginia They were deaf to my appeal, and this old derrick today stands in the midst of a dozen oil wells, gushing from 100 to 500 barrels each, and sending 2,000 barrels of the finest oil in the world throbbing through the pipe line on its way to the sea. The Mt. Morris, Doll's Run, Fairview, Mannington, oil and gas field whose southern end no one has yet found, and which, in my opinion will prove the largest and richest oil and gas belt the world has ever known, was largely covered by the leases which the Pittsburgh syndicate held.

Until the year 1889 the oil magnates of the country paid no serious attention to West Virginia. This date, however, is a "red letter" one in our oil history, for it marks the opening of Doll's Run, Mannington, and the rise of Eureka to prominence. These three developments brought the Standard Oil Company to realize that here in West Virginia was to be the great oil field of the future, and that much berated monopoly has come into our State to take possession of its oil business. How many hundred thousand acres it has leased or purchased I do not know, but the territory it controls is a vast one, and the million and a half dollars it has expended in building a pipe line from Morgantown to the sea attest that it is with us to stay.

It is my firm belief that this great oil belt, which has come down to our State through a distance of 200 miles, will extend clear across the same from Hancock to Logan. Only today I received a telegram that a large flow of gas had stopped the drill at a well in Gilmer, while Major Hotchkiss, the eminent Virginian who has so eloquently depicted our rich mineral resources this evening, and who, although a native of another State, has done more to develop ours than any citizen in it, tells me that a well being dri led by his company in Lincoln has had to shut down for the same cause. The gas wells at Warfield, on the Big Sandy, and those at Burning Springs, above this city, complete the chain of evidence that the oil belt will extend entirely across our area from the Pan-Handle to Kentucky, for wherever the gas occurs the heavier fluid is not far away. How much of luxury and comfort this underground wealth

will bring to the homes of our State, no man can estimate, but our future in this respect could not be brighter.

With the greatest coal field in the world, giving us an ample supply of solid fuel for all time to come; with this great stream of liquid gold coursing through our rocks, only waiting to be tapped; with the largest fields of natural gas the world has ever seen, to bring comfort and ease to our homes, where is the commonwealth whose future is brighter than ours? All that we need do is to let the world know what we have. This we must depend upon our representatives now in session in this city to accomplish. Business men pay very little attention to statements that do not bear official sanction. Hence it is to be hoped that in providing for a proper display of West Virginia's resources at the approaching World's Fair you will adopt a broad and liberal policy. And now whatever you may do be sure to make provision for the preparation of an accurate map of the State. The miserable caricatures that we now have that are called maps of West Virginia, although infinitely better than none, are a disgrace to the State, so that if you do nothing else, at least provide a splendid map upon which our wondrous resources in timber, in coal, in ore, in oil and gas can be exhibited.

FIRE CLAY.

One of the least developed and at the same time most wide-spread of all the natural resources of the State is its clay. There's scarcely a county in the State in which there are not found beds of valuable clay, in few of which it has been utilized, though in nearly all it has been tested and found to be of value. Building brick is made at almost any place and some of them are remarkably fine. In the Kanawha valley the ordinary soft red brick are often so smooth and clean in their appearance as to almost pass for pressed brick. They are so hard that they are used for street paving and a test block put down in Charleston twenty-one years ago on a much used street is now as good as ever. A sandy, clayey soil is used for ordinary brick and its presence is almost universal in the State.

But other clays, more valuable than these, are found in nearly every county of the State The fire clay is a companion of the coal measures and along with the beds of coal are nearly always found beds of fire clay. Often they may be mined together and sometimes, as is the case in Hancock county, a seam of either would be too small to work alone, but by digging both from the same mine both are made profitable. The uses to which fire clays may be put are numerous and varied and the demand for the products of the clay is rapidly increasing As showing the uses to which the clays are put we quote from a report of the U. S. Geological Survey as follows:

"The uses made of fire clay are best shown by a brief statement of the wares manufactured from them in New Jersey, since this

State probably produces three-fourths of the entire amount of such manufactured articles. The largest use of the white clays of New Jersey is in making fire brick and retorts for gas works and zinc works. Refractory clay is also used for making sewer pipe and chimney tops, and the poorer qualities are shipped in enormous quantities to other States, to be used there for sewer and drain pipe. Terra cotta is also made from the poorer grades. Porous brick and terra cotta lumber are made in large quantities, and are used for fire-proof partitions, doors, ceilings, roofs, etc., for safe and refrigerator linings, and for other purposes where non-conducting and fire-proof materials are required. Roofing tiles and hollow brick are also made. These clays are largely used by paper manufacturers in glazing and weighting paper. A considerable quantity is used in the manufacture of alum."

In this State the fire-clay industry is growing, but paving brick is the principal article manufactured from it. In 1867 there were less than seven million fire brick made in the State. In 1892, in Hancock county alone—the principal fire-clay county of the State—some seventy million brick were made, besides sewer pipe, tile and pottery. In 1872 the first brick roadway ever paved was made in Charleston. It was a West Virginia invention and a small square was put down as an experiment. It proved to be a great success, and now in many of the larger cities of the Union, as well as in the smaller ones, the system of paving streets with brick is the one most universally adopted. Within the last few years this system has been coming more generally into practice, and with the growing demand for paving comes the increased demand for paving brick. In the experience of practiced engineers the fire brick, made of the fire-clay which is found almost at any place in West Virginia, is unsurpassed. The brick is hard and lasting, does not crack or crumble or decay and lasts much longer than the soft-burned brick with which the first street pavements were all laid. The growing popularity of the brick-paving system and the excellence, for that purpose, of the clays of West Virginia, will give to them an increased value and make more profitable even than in the past the fire-clay beds which so abound.

Another use to which it may be put, which helps to give a value to the clay, is the making of coke ovens. Already it has been

shown that making coke is one of the principal and most rapidly increasing industries in the State. Coke ovens must be built in which to burn the coal in the process of coke-making, and here the clay, which seems to follow up the seams of coal, comes into special service. The manufacture of tile and sewer pipe and chimney pots, etc., brings into great demand the best fire-clays, but the principal use from which the chief value of the clay is to be derived, is in the making of fire-brick for paving and for making coke ovens. In making brick for both these purposes there is considerable profit. Good fire-clay may be found in many places, plants for working it are not expensive, and the past has proved that there is money in it and that those who embark in the fire clay business receive a rich reward for their investments.

The varied uses to which it may be put, the increasing demand for the products of fire clay, the excellence of our clay and the cheapness with which it may be worked, all go to indicate that in this line a great industry will be built up among the people of our State. Already, as shown above, the paving brick industry has increased remarkably and, with the new demands for brick to pave with, must continue to increase at least as fast as it has in the past, and there are those who now most confidently predict that West Virginia will ere long outstrip New Jersey in this line and stand at the head of all the States in the manufacture of fire clay products.

Prof. M. F. Maury, describing fire clay, says: "Fire clay is frequently found in the coal measures, often underlying a seam of coal. It results from the decomposition of siliceo-argillaceous shale, and its plasticity and impervious nature, when collected in a bed, prevents it from being carried away by infiltration."

C. E. Dwight, speaking of a Marion county clay, says: "The clay is superior to the Mt. Savage (Pa) clay, which has obtained such a reputation here in Wheeling as to exclude all other clay for blast furnace use. The analysis of Mt. Savage clay shows 1.5 per cent. of rotoxide of iron, while this clay has no trace of this greatest enemy to the refractory nature of fire-clays"

Beds of fire-clay may be found in all parts of the State. In Hancock county the greatest development has been made, but in nearly every other county clays of varying value may be found. The beds

range from several inches to many feet in thickness, and are mostly found beneath the level of the earth.

Analyses of a few of the fire-clays found in the northern part of the State are as follows:

	Marion County.	Preston County.	Monongalia County.
Silica	45.86	68.16	54.27
Alumina	44.23	24.11	33.83
Oxide of Iron	0.00	0.01	0.01
Lime	0.24	trace.	trace.
Magnesia	0.36	trace.	0.02
Potash and Soda	trace.	trace.	trace.
Moisture, hygroscopic	0.70	0.85	1.00
Moisture, combined.	8.35	6.66	10.86
Organic matter		trace.	0.15

POTTER'S CLAY.

"This clay," says Prof. Maury, "resu'ts from the decomposition of granite and shales. That in West Virginia comes from the latter source entirely, of which there is great abundance and variety, so that we may look for very many deposits of the material. When it is yellow or red it denotes the presence of oxide of iron, which tinges the manufactured articles red. When the clay is white there is no iron present. Potter's clay has a peculiarly unctious feel and has the valuable property of resisting heat without cracking."

Though not so plentiful as the fire clay there is still a great deal of the potter's clay throughout the State, much of it being found along with or near to the fire clay. The uses to which it may be put are not so varied as those which give its value to the fire clay and yet the finer grades of work for which it is adapted give to the potter's clay more value than to the other. For making crocks and jugs and jars and other pottery wares the finest kind of clays are found in West Virginia. This is no theory but a fact amply demonstrated by years of practical illustration. At many places in the State the clay is now in use, and various kinds of earthenware are daily made. Some of the works have been in operation many years and always found a market for their products. In fact the home demand has never been supplied with home production. The canning season never comes but with it come great quantities of jars and earthenware from Pennsylvania or some other State besides

our own. Every year immense amounts of earthenware in the shape of jars and jugs and crocks come in from other States while in our own lies hid beneath the surface of the earth the finest kind of clay in quantities ample to supply not only this but many other States with all they need. The kind most often found and used the most extensively is a white clay which burns into a sort of blue. In counties in almost every section of the State these clays are to be found. From the northern extremity to the southern it may at intervals be found and probably in nearly every county of the State it would be disclosed if properly sought. These potter's clays with the fire clays previously mentioned will some day make of West Virginia the greatest clay working State in the Union.

When improved processes are learned for making aluminum and that metal which promises to attain such an important position among the metals of the world comes into universal use, the clays of West Virginia will play a most important part in its production. From nearly every kind of clay now found in West Virginia aluminum may be made. The material is here, the product is in demand. A simpler process for its manufacture is all that is needed to bring it into general use and give intrinsic value to the clays for which our hills are famous.

STONE.

A straight line drawn from the southwest corner of the State of Pennsylvania directly southward through the center of West Virginia would describe roughly the western border of the limestone section of our State. In some of the counties west of this good limestone may be found, but east of it are the principal limestone counties of the State. In many of the best of these the limestone soil is equal to the very best in the famous limestone belt of Kentucky.

In the "Resources of West Virginia," Prof. Maury, writing of the common limestone, says:

"In great abundance and of great purity, this stone is found in the region between the coal measures and the eastern border of the State. In the counties in the coal formation in the northern half of the State it is also very abundant, the Lower Barrens and the superincumbent strata containing, in some districts, an aggregate of 75 to 80 feet.

"In the southern counties of the coal field there is a striking scarcity of this mineral, the seams being thin and usually of very poor quality.

"The limestones of West Virginia are suitable to all the purposes of the farmer, builder and blast furnace use. Where there is so much land that would be most materially benefitted by the use of lime, this material should attract the attention of the agriculturist far more than it does. Indeed it is rather a matter of surprise that the agriculture of this State has hitherto been suffered to reap so little benefit from this source of improvement so easily within reach. As yet, its application as a manure has been restricted to particular neighborhoods, though there is no portion of the uplands,

especially of the limestone regions themselves, where it could not be used advantageously. The impression that the soils of a limestone country are already impregnated with calcareous matter, in consequence of the proximity of the limestone, which in many places rises to the surface in the fields, seems more than any other circumstance to have lead to the erroneous idea that lime could be of no benefit to the soil. It may, therefore, alter the opinions of many to state that in a great many cases the soils, even when in contact with this class of rock of the best quality, contain little or no available calcareous matter, for to have it the material must be in the form of a soluble salt, and the ledges which crop out on the surface are carbonate of lime, which may be said to be insoluble for all practical purposes. When, however, it is burnt and applied to the land as quick-lime, it imparts fertility partly by being dissolved in the surface waters, and so passing into the soil in such a shape that the roots of plants can seize hold of it, but mainly by tending to decompose vegetable matter and so form a fertilizing humus."

The following are analyses from various portions of the State, and will tend to show the great purity in which this mineral may be found:

COUNTY.	Locality.	Carbonate of Lime.	Carbonate of Magnesia.	Alumina and Oxide of Iron.	Insoluble Siliceous matter.	Water and Loss.	Authority.
Grant	Knobly Mountain	90.08	4.00	0.72	4.56	0.64	W. B. Rogers.
"	Near Petersburg	88.52	3.24	1.52	6.00	0.72	"
Greenbrier	Fort Spring	90.11	2 49	2.02	5.04	0.34	J. B. Britton.
"	On C. & O. R. R	93.76	0.29	1.12	3.92	0.91	C. E. Dwight.
"	Blue Sulphur Springs	98.20	0.00	0.48	0.40	0.92	W. B. Rogers.
"	Muddy Creek Mt	88.64	9.60	0.12	1.20	0.44	"
Harrison	Near Clarksburg	95.52	1.88	0.96	0.92	0.72	"
Jefferson	Harper's Ferry	81.16	10.80	0.52	6.68	0.84	"
"	2 miles S. W. H. F	53.88	43.40	0.48	1.68	0.56	"
"	4 " W "	95.86	1.46	trace.	1.83	0.85	"
Mineral	Patterson's Creek	92.44	1.40	0.76	4.96	0.68	"
Monongalia	Grenville Furnace	88.32	0.00	2.52	7.24	1.92	"
Monroe	Red Sulphur Springs	90.92	trace.	1.20	6.20	1.68	"
"	Union	95.92	"	0.56	1.88	1.62	"
"	Dunlap's Creek	86.52	9.52	0.52	2.96	0.48	"
"	Little North Mt	78.48	9.20	1.00	10 80	0.52	"
Ohio	Willow Grove	85.95	1.38	4.10	7.61	0.96	C. E Dwight.
Preston	Jenkins' Lime-Kiln	88.16	2.32	1.16	5.80	2.56	W. B. Rogers.
"	Richard Foreman's	91.80	5.72	0.40	1.36	1.72	"
"	Below Coal No. 2	79.52	2.80	3.12	13 80	0.76	"

A tufa limestone is found in some of the eastern border counties of the State. "It is formed by the precipitation of calcareous matter from limestone water and may therefore be looked for in those neighborhoods where the springs thus impregnated are of general occurrence." In some of the counties thick deposits of this chalky material are found. Prof. Maury says:

"Its utility in agriculture, added to the facility with which the deposit may often be obtained (no quarrying being necessary to separate it from the mass), renders it a very advantageous substitute for the limestones of the same neighborhood. Moreover it should be remembered that in its more friable and powdery state, it may, as in Europe, be very beneficially applied as a marl without being burnt Although it is of the same composition as limestone, yet when it is spread on the ground in a pulverized state, it presents so large a surface to the action of the carbonic acid that exists in the atmosphere, and is generated by the decay and decomposition of vegetable matter, that a portion of it is converted into a soluble bi-carbonate of lime, which can then be taken up by the soil. But as this chemical change is slow, a larger quantity has to be applied to the land, than if it was first burnt. If the ordinary pure limestone was ground to powder, it would have the same effect, but the expense forbids it being done, and besides, burning the hard stone is cheaper, as well as produces a more active fertilizer. The immense improvement that tide-water Virginia has derived from calcareous marl must render any illustration of its beneficial effects quite superfluous, when it is understood that its composition cannot be distinguished from the better classes of pulverulent marls, independent of which its value has been unequivocally tested in other countries, where it has been found to have the most decided ameliorating effects upon land to which it is properly applied."

Hydraulic limestone is found in many portions of the State, particularly in the north-eastern part where much cement is made from it. In Berkeley and Jefferson counties the burning of lime and cement form an important industry and give employment to a great many men. In a few other counties lime is made but not in any quantity, though nearly all in the district named above have stone from which excellent lime might be burned.

MARBLE.

True marbles are not found in great quantities, but there are in all the eastern counties along the Alleghany range carbonates of lime which much resemble them and in places true marbles do exist. In the descriptions following of the counties of Greenbrier, Hampshire, Jefferson, Monroe, Pocahontas and others, some accounts will be found of the marbles which exist in those counties. Nothing has ever been done toward their development, principally for the reason that they are found in the most mountainous and inaccessible portions of the State, but as pretty specimens of black and white marbles as were ever seen have been taken from the mountains of our State, and once within the reach of railroads the opening of the marble quarries is assured.

BUILDING STONE.

Most excellent building stone abounds throughout the State. The hard and flinty limestone which is thickly scattered over a great part of the State makes the most substantial and durable of building stones, and many buildings made of it have stood the wear and tear of time for more than a century.

In Jefferson county a fine variety of building limestone is found. It is quarried in large quantities and finds a ready market. Many tons of it have been floated in barges down the Potomac where some of the finest buildings in the national capital attest its beauty and its value as a building stone.

At Weston the West Virginia Hospital for the Insane, a building of from three to five stories in height and with a frontage of over 1600 feet, is built entirely of a native blue sandstone. It is a splendid stone, does not crumble, is hard and durable and very pretty.

In the Great Kanawha valley is a white sandstone which has been extensively used, in the construction of the State capitol, the handsome Kanawha county court house, the government locks of the Great Kanawha improvement, bridge piers in the Kanawha and Ohio rivers and for many other purposes. The stone is peculiarly adapted to use beneath the water, resisting the action of the water and lasting for years with no indication of decay. In the New river valley near Hinton is a similar stone which has been used exclu-

sively by the Chesapeake and Ohio Railway Company in the construction of its piers on the seaboard, the stone being taken from that place because of its peculiar fitness for the ocean use for which it was intended.

Near Hinton also, in Summers, Greenbrier and Monroe counties along the line of the Chesapeake and Ohio railway are ledges of red and brown sandstone of considerable value. The brown stone is a beautiful one, of unvarying color, fine grain, hard and durable. Specimens of it are seen in some of the handsomest buildings not only in this State but in eastern cities as well, where it has been shipped in large quantities

GRINDSTONE GRITS.

In several places in the State good grits are found for making grindstones, whetstones, etc. Near Parkersburg, on the Ohio side of the river, the largest grindstone works in the United States are said to be located, and the same ledge of stone is found on the West Virginia side of the river. Good grits for millstones, whetstones, etc., are found in many other counties of the State.

GLASS SAND.

In Morgan county, near the Berkeley Springs, is a ridge of sandstone, which when crushed yields a beautiful white sand of exceptional purity. It is about the best glass sand found in the United States, and large quantities of it are shipped to points where glass is made. Great quarries are scattered along the ridge where the sand is gotten out and crushed and daily heavy shipments are made. The supply of sand is almost inexhaustible and being of unusual purity and easily secured affords a source of considerable wealth to the county.

In Hampshire county is a similar ridge of glass sand, but from this little has ever been shipped. It is a splendid sand, said by some to even surpass the Morgan county sand. It is found in great quantities and is of exceptional purity and whiteness.

In Marion county an excellent glass sand is also found and used in the glass works at Fairmont. In Monongalia, Kanawha and other counties good sand is found, but little used.

MANGANESE.

This important ingredient in the manufacture of steel, which is largely used for other purposes as well, is found in more or less purity in nearly all the eastern counties of the State along with the iron ores. It is found as a black oxide of manganese, frequently containing a large per cent. of manganese. Analyses of a few samples will be found in the table of analyses of iron ores on one of the preceding pages.

GRAPHITE is found in Hampshire county, and will be described in the following pages, under the heading of Hampshire county.

GYPSUM, or plaster paris, is found in one locality of Greenbrier county and will be mentioned under that heading.

OCHRE is found in several counties of the State—notably in Lewis, Hardy, Pendleton, Wayne and Cabell, but no developments of it have ever been made. Other mineral paints are found in places.

SALTPETRE is found in some of the caves of the lime-tone region in the eastern portion of the State.

GOLD and SILVER ores are often found in the mountainous regions of the Alleghanies, but they contain at best but slight traces of these precious metals, and only serve to raise delusive hopes. There is no gold or silver of value in the State despite the finding of these ores.

LEAD in small fragments is found in many of the counties of the State, and in some of them enough was one time found to enable the pioneer settlers to run their own bullets out of native lead. Many stories are in circulation of hidden veins of lead from which the Indians moulded ornaments and balls, but none of the veins have ever yet been found. There is more lead than gold or silver in the State, but not enough to be of any value, or to warrant the mention of lead as one of the resources of the State.

Of ZINC, TIN and COPPER much the same thing may be said, except that the quantities in which they exist are even smaller than the lead. A few scattering ores containing little of the metal are found in some of the mountain counties, but zinc or tin or copper never will amount to anything in West Virginia.

MINERAL WATERS.

Throughout the mineral region of the State are many mineral springs, the waters of which, holding in solution various chemicals gathered from the soil, are of great value as medicinal waters. Following the Alleghany range which forms the eastern border of the State, and about equally divided by the State boundary is the mineral spring region of the two Virginias. Throughout this region springs abound, and for many years the numerous hotels that have been built around them have been frequented by hundreds of those from all parts of the country who go each year in search of health or pleasure.

The eastern part is not the only one in which these springs are found, but more of them are there than in any other portion. There's hardly a county in the State but has some mineral spring of value, and while in money value the springs of West Virginia are not among her chief resources, if valued by their capability to bring health and comfort to humanity, and restore the strength and vigor so often lost, the springs are certainly among our best resources. As health and the consequent happiness are more to be desired than riches the springs of West Virginia are probably of more real benefit to mankind than all the coal or iron or timber in the State.

A writer in "Resources of West Virginia," prepared under the direction of the State Board of Centennial Managers in 1876, describes the springs of West Virginia as follows:

"The springs of this State present considerable variety of chem-

ical character, and therapeutic adaptation—comprising various and differently compounded sulphur waters; the chalybeates, simple, and compounded; the acidulous, or carbonated; the saline; the aluminated chalybeates; with thermal waters, not of very high temperature.

"Of these springs, the sulphur waters, so far as such springs have yet been developed, are found in greatest abundance, and in greatest strength, on the southern border of the State, and on the western and northern slopes of the Alleghany mountains. The simple chalybeates are found in every great section of the State, but in greatest strength, so far as they have been tested, along the course of the great Appalachian ranges, extending from the northeastern to the southwestern extremities of the State. The acidulous carbonated waters, as well as the aluminated chalybeates, are found in different parts of the State, but have been most developed on its southern border.

"The most valuable mineral waters of the State, so far as they have been tested in the treatment of diseases, are the sulphurous,—the alum waters, as they are called commonly, and the compound acidulated waters. The latter especially, are generally found adjacent to faults in the strata, or where the rocks give evidence of displacement from their natural position, and near the juction of slates with limestone.

"The alum waters, so far as I have ever known, are an infiltration through slate, which generally lies a few feet below the surface of the earth, but often cropping out considerably above it. I have examined numerous specimens of these waters, obtained from different sections, and found them all to possess the leading chemical characteristic of the springs of this class, which have been brought into popular use.

"My observations are to the effect that the mineral waters of the State generally, and certainly those within the ranges of the disturbances of the rocks so common in the southern section of the State, are slightly thermal, compared with the temperature of the common springs in their vicinity, or of the earth through which they flow. The decided thermal waters, some of them running up as high as 107°, are found immediately on the eastern slopes of the Alleghany in

Virginia, and within a few miles of the southern border of West Virginia.".

THE BERKELEY SPRINGS at the town of that name, the county seat of Morgan county, are among the leading and longest known mineral springs in West Virginia. They are owned by the State, and are in the care of a board of trustees appointed by the Governor, by and with the consent of the Senate. The waters are very valuable in cases of rheumatism and kindred diseases. Bath houses, swimming pools, etc., are provided by the State. The water comes from very bold springs which flow enough to create constantly a good sized stream of fast flowing water. The temperature remains always at 74 degrees Fahrenheit, never varying in summer or winter. In the Colonial days before the Revolutionary war, General George Washington and other makers of history were among the visitors at the Berkeley Springs, and the reputation of the water given to it more than a century ago, has always been retained. In cases of nervous disorders, rheumatism, debility, etc., they have effected many cures.

THE WHITE SULPHUR SPRINGS, in Greenbrier county, are among the most noted of the fashionable summer resorts of the country and are visited annually by thousands of people, particularly from the south. Hotel capacity at "the White" is ample to accommodate from 1,500 to 2,000 people and in the season there are nearly always visitors enough to tax accommodations to the utmost. The water contains sulphates of lime, magnesia and soda and other ingredients and flows at a uniform temperature of 62 degrees at the rate of over 30 gallons a minute. The use of the water is very benefical in many cases, its influence on the system being *cathartic*, *diuretic*, *sudorific* and *alterative*. Bath houses are supplied for external as well as internal application of the waters. The spring is at an altitude of 2,000 feet above sea level and the fresh air and beautiful mountain scenery combine to make the springs a pleasant place to visit.

THE SALT SULPHUR SPRINGS, in Monroe county, are another popular resort. The water contains much the same ingredients as that of the White Sulphur Springs, though in different proportions. It is a very popular resort for health and pleasure.

THE RED SULPHUR SPRINGS, also in Monroe county, have had for

years a high reputation for their effect in the treatment of lung diseases.

THE OLD SWEET SPRINGS, in Monroe county, are among the oldest resorts in the Virginias, which have constantly been kept up and maintained their reputation. The waters contain much the same ingredients as those of the White and Salt Sulphur Springs.

CAPON SPRINGS, in Hampshire county, are unlike any of the other springs of the State, containing silicic acid, soda, magnesia, bromine, iodine and carbonic acid. The water is beneficial both as a bath and a beverage.

PENCE'S SPRING, in Summers county, has recently acquired a considerable reputation and while the accommodations for visitors are few, many are using the water and all with beneficial results.

THE WEBSTER SPRINGS, at Addison, in Webster county, have for many years afforded relief to many persons suffering with stomach troubles. The springs are 1430 feet above sea level and surrounded by mountains as much as 1400 feet higher. The springs contain sulphur and salt and after a short time the water becomes very palatable.

In all the counties along the eastern border springs are numerous, and space forbids the mention of them all. In almost every county waters of more or less medicinal virtue have been found and have attained a local reputation.

AGRICULTURE.

Except in some of the older portions of the State where experience has taught the value of the soil, the proper attention is not paid in this State to agriculture. While much of the State is mountainous and rocky, there are on the other hand some lands as fine for agricultural purposes as ever the sun shone upon, and there is scarcely in the State a square mile of earth that is not fitted for some kind of agriculture. The rough character of much of the land, the thinness of our population, the difficulty of reaching a market with the products of the farm, have all combined to prevent the tilling of the soil, and hardly grain and garden stuff enough are raised to supply the demands of the population of the State, while much should be exported. "The way in which the State was settled," says Professor Fontaine, "and the consequent habits of her inhabitants, have been unfavorable to the existence of extensive or skilled farming, and have directed the industry of the people into almost every other channel. The original settlers were to a large extent men without means, who, on entering this country, then cut off from all exit to market, were content to clear small patches of ground, whose generous response to even poor cultivation, yielded returns sufficient to supply their limited wants. His little 'clearing,' selected in the most convenient spot, was cultivated by the pioneer year after year, in corn, and vegetables, which served to support his family, along with a hog or two, and possibly a horse and a cow, and with fowls, and the abundant game in the forests around, there was abundance of meat and bread. Even now, in many parts of the State this is the mode of life.

"When the original clearing was exhausted by long tillage, an addition was made by felling more timber. Thus the cleared lands gradually grew around the cabins, until extensive openings were made, but still without causing attempts at establishing communication with the outside world. This independent mode of life impressed upon the people habits of thought and action, which, though calculated to foster industry, frugality and hardiness, were not most favorable for the promotion of undertakings which require communication with, and dependence upon, other countries

"We see at the present day the influence of this training. Until of late West Virginians have paid but small attention to the raising of agricultural products for exportation. They are usually content with the production of a sufficiency for home consumption. But rarely is an improved system of farming employed, and the cultivation is of the rudest kind. The tendency is to look to other sources than the farm for products of exchange. As an example, this spirit has led our people along all the streams which can float a raft, to denude the forests of the magnificent timber which they afford, often sacrificing it in the most prodigal manner. So, too, they turn their attention, when the finer timber has been removed, to the getting of tan-bark, hoop-poles, etc., which business occupies a very important position among our industries. All of these causes have led to a neglect of agriculture, and stock farming, industries for which, especially the latter, our State is peculiarly fitted."

Of course this is not true of all the State. In some sections the tilling of the soil is the principal industry, new and improved methods are employed and farming on a large scale is conducted. But as a rule the methods are primitive and the business carried on in but a small way. Too much attention has been paid to cutting timber and not enough to the cultivation of the soil after its removal. Because our State is small and rather rough with many mountains breaking the surface and giving grandeur to the scenery, because it is young and has not long had rank with other States, new settlers often shun it and seek the poorer soil of western States. Some think that coal is all we have, and do not know that West Virginia can produce more and better blue grass than the world famed Kentucky. We are too often passed by through igno-

rance. The words of Prof. Fontaine are as true today as they were when in 1876 he penned the following:

"For the general and thorough working of our lands, we greatly need an immigration of industrious settlers. Thousands pass yearly through our State to the far west, not knowing that here they can find an abundance of untouched virgin land, at nominal prices, and with a fertility not surpassed by any which they can hope to gain in the remote west. But suppose that lands were higher, and poorer here, our climate and proximity to the great markets, must ever give us a great advantage over farmers who, when they make a good crop, find it destroyed at one blow, by the ravages of insects, by tornadoes, or floods of rain; and who, if successful in escaping their numerous enemies, find all profits swallowed up in charges for transportation to markets which lie at our doors."

In the same line of thought, as to the need of industrious settlers, Governor Wm. A. MacCorkle in his inaugural address, delivered March 4, 1893, gave utterance to the following language:

"We welcome into our State the immigrant who comes to us with the idea of home seeking and home building with all its profits to the State, with its family ties, with its clearing of the forests, its building of church and school house, its expenditure of all that is made in our State and its exercise of citizenship. . . . I do not in any way wish to be understood as decrying incoming wealth or offering obstruction to its advent in our midst, but believe that West Virginia, the south and south-west, should take steps to bring into their borders the small immigrant or home builder, and thus, by the actual settlers' efforts, our lands will be developed by those living upon them and spending in our State the fruits of our mines, forests and fields. The effort should be made by us to bring the small settler as well as the large land owner, but not one to the exclusion of the other. At this time, the reflex tide of immigration is again directed to the south and south-west and away from the north-west. Whilst we welcome the incoming of the wealthy land-owner, still, in my opinion, he should not be welcome alone, but every intelligent effort should be made by the State to induce the small land owner and actual settler to come amongst us. I believe that this is the best corrective of the influence of large non-resident ownership of lands in this State, the burden of which we shall in a

short time feel. I shall offer any assistance in my power to legislative or other action, looking to the inducement of actual settlers to come to our State. The great area and richness of our coal and hard wood timber, in both of which we are first in this great country, the great production of coke in which we are second and soon will be first, the great development of railroads, in which last year we were first in the United States, our splendid soil, equitable climate and good school system, all offer unparalleled inducements to the incoming citizen and actual settler "

With altitudes varying from 500 to 4,000 feet, producing a climatic range of 14 degrees of temperature, with every variety of land and soil within the confines of the State, its crops are naturally produced in great variety. The greater part of the State is fine agricultural land. The upheaval of the mountains left many of their sides too steep and rocky for cultivation and yet the land that is not fit for cultivation is but a small part of the State. Upon the very tops of some of the highest mountains in the State are cultivated farms which, while not as rich and productive as the fertile valleys, still yield good crops. Few mountain sides are found too steep for the hardy mountain farmer, and much of the corn of the mountain districts is raised on steep hillsides on which, to one who had not seen it grow, it would seem impossible to raise a crop at all.

CORN.

Corn is the principal crop of the State. There are several reasons for it, principal of which is the better adaptability of the soil to raising corn. Rough lands on which wheat and other crops could not be grown at all yield well in corn. From early years the inhabitants of the State have been accustomed to making corn their principal crop as well as their principal article of food In one form or another it enters into nearly all the articles of food that find their way into the mountain cabin and could not be dispensed with. For animals, as well, it forms the principal article of food, and being thus the chief supply for man and beast, it is most largely raised. A good, rich soil is needed to produce good corn, and newly cleared lands possess this requisite so that following the clearing of the land the first crop raised is nearly always corn. Taking

the State as a whole, good land and bad, the average yield of corn may be taken as about 35 bushels to the acre. Some lands fall as low as 25 bushels to the acre, while some would not bring corn at all. Twenty-five bushels is about the minimum on unfertilized land, while in the best river bottoms the yield runs frequently up to a hundred bushels, and in Hardy county one yield of 166 bushels to the acre is actually on record.

WHEAT.

Next to corn the most important crop is wheat. Unlike the corn this cannot be raised to good advantage on newly cleared land. Comparatively level land, well cleaned of roots and stumps, is necessary, and only in the older portions of the State is wheat much grown. The Ohio river bottoms afford an instance of the best wheat country. Rich and level, easy to cultivate, they produce large crops and with good shipping facilities the markets are readily reached. The yield varies from ten to twenty bushels to the acre. Much of the wheat raised in the State is ground at home, comparatively little being shipped, and even then the home supply is not equal to the demand, and wheat and flour are both imported from other States.

OATS.

In the grain production of the State oats rank third. They are raised principally for feed for stock, and often the grain and stalk are fed together, making excellent feed for animals. They grow well on almost any soil, and as a rule yield well. About 30 bushels to the acre is an average yield.

BUCKWHEAT.

This is a crop to which the mountain lands are well adapted, the high cold portions being particularly well suited to its growth. The wet, cold glade regions seem to possess the necessary qualifications for its growth, and there buckwheat does well. In the high and mountainous county of Preston, most of the buckwheat of the State is produced, though in many other counties it forms quite a crop. The average yield is about twenty bushels to the acre. It grows with little attention, ripens rapidly, and tends to drive out weeds.

SUGAR CANE.

In many of the counties of the State the Chinese sugar cane is largely grown. No sugar is made from it, but its use is exclusively for the manufacture of sorghum molasses. The juice is extracted from the cane by pressure and boiled into a thick molasses which is very generally used throughout the country. A good yield is from 200 to 300 gallons to the acre.

TOBACCO.

Another crop most excellently adapted to the mountain soil of West Virginia is tobacco. The rich new earth of hill or valley, after the timber which has long stood over and enriched it is removed, is just the soil required by tobacco. The rich valleys of the streams which water all the State are also suitable for its growth, and a good deal of it is grown. In certain portions of the State it is the principal crop, and very fine tobaccos are sent to market where they command the highest price. In Lincoln, Fayette, Raleigh and other southern counties a splendid grade of tobacco is grown, which always brings a high price in the market. The high hill lands of most of the State are suited to the growth of tobacco, and in almost any part of the State good crops might be raised. High prices may always be secured, and more attention to tobacco would bring annually much money to the farmers of the State.

GARDEN STUFF.

The nearness of much of the best agricultural land of the State to large and growing cities, and the easy access that may be had to them, has brought about a great demand for garden products The bottom lands particularly make the finest of gardens, and when properly managed yield much larger profits as such than when put to any other use. The miners, who form a large part of the population of the State, as a rule make no pretense of raising their own vegetables, and gardening for them as well as for the towns and cities is quite a profitable industry All kinds of vegetables suited to this climate grow in West Virginia, and the wide climatic range, before referred to, gives within the State long seasons for all the vegetables that are grown. Wild berries may be had for

nearly six months in the year by following them from the warmer parts through cooler ones and up the mountains, where they ripen many months later than in the lower parts. A great deal of attention is paid to the coarser vegetables, such as cabbage, potatoes, turnips and the like, much of which is shipped to city markets, while tomatoes, corn and fruits are sent to canning or preserving works. Some fruit and catsup works purchase in advance the entire crop of all the tomato farms they can secure.

FRUITS.

The cool, high hill-tops where late frosts hold back the buds and prevent too early maturity, thus avoiding danger of being killed by late frosts, are admirably suited for all kinds of fruits. Apples, particularly, are suited to the State and in some counties form almost the principal crop. The cool, fresh air of the higher lands gives a flavor to the fruit not to be obtained elsewhere and makes for the crops a constant demand. The summer fruit, which readily decays and must be used at home, is often too abundant to be used and much of it goes to decay unless made into vinegar, but in the fall the fruits that ripen are mostly good, sound winter fruits that keep all winter, and for these there is always a splendid market. Hancock county alone last fall shipped 50,000 barrels of apples. In other counties not so much is grown, though in all, the conditions are favorable and usually the demand is good.

Peaches do well in most of the counties and a good many are raised. But still the markets are usually supplied from other States, and frequently the expensive prices prevent their sale, while if grown at home a handsome profit might be made and the fruit still sold at reasonable prices. The northeastern part of the State has many peaches and very delicious ones.

Pears, plums, cherries and other small fruits all do well in every county of the State. Berries of all kinds yield well, and in places are grown in considerable quantities.

For grapes most sections of the State are peculiarly adapted. "The vine clad hills of sunny France" are not more favorably situated for grape culture than are the hills of West Virginia. On this subject J. H. Diss Debar says: "On a surface so diversified as that of our State, it would be difficult to survey off a one-

hundred-acre tract anywhere without including at least one suitable exposure for a vineyard of from five to twenty acres, either in the valleys or on the slopes, of from five to twenty-five degrees. German wine growers, who prefer steeper grades, will find the rock necessary for walling up a few feet below the surface everywhere." Few grapes are grown, those which are being raised chiefly in small vineyards and principally for local use In only a few places are vineyards of any size cultivated, though there is scarcely a section of the State where they would not be profitable.

Too much of West Virginia land has been tilled merely for subsistence, the owner only caring to raise enough to live on. In the country where hog and hominy are the staples the hogs are turned loose to earn a livelihood, and the farmer raises a little corn to keep himself, his family and his stock until the next year's crop is ripe. Properly cultivated the soil of West Virginia would yield good crops and not only supply the farmers with what they need to eat, but give them a large surplus. Except in comparatively few places farming for profit, or for anything else except as a means of subsistence has seldom been engaged in, but the soil and climate are here presenting excellent opportunities to farmers, who as a rule heretofore have been induced to give up farming for the more promising work of cutting timber, ties or poles, and so the land has been neglected. More good steady farmers are needed in West Virginia to help those we now have to make the farms of the Mountain State bring forth abundantly and feed the people already engaged in getting out our hidden treasures or in other profitable pursuits.

GRAZING AND LIVE STOCK.

In many of the counties of the State the blue grass is indigenous to the soil. It springs up, as soon as the forests overhead are taken off, and covers hill and valley with a most luxuriant growth. This finest of all grasses, which has given Kentucky its fame, exists in even greater quantities in West Virginia than in Kentucky. Ex-Governor A. B. Fleming, in a speech two years ago, made use of the following language:

"Kentucky is called 'the blue grass State,' and it is generally believed that blue grass nowhere else abounds as in Kentucky. I would not detract from our neighbor or seek to diminish the just

pride every Kentuckian feels in that which has made his State famous; but I assert upon information and belief that there are more acres of blue grass sod in West Virginia than there are in Kentucky. It is the predominant grass though not our chief reliance. Clover flourishes everywhere, timothy grows in rank luxuriance on our limestone and other soils, while to the possessors of light lands orchard and mixed grasses come almost as a special gift from Providence, affording an excellent hay and abundant pasturage. Thus the entire State is particularly adapted to stock raising, which affords a most delightful and usually a most profitable pursuit to our land owners. West Virginia's live stock, horses, cattle and sheep, command the highest prices; her wool is at the top of the market, and her dairy products are sought after by those of the most epicurean tastes."

The limestone region of West Virginia, as previously mentioned, covers about half of the entire State, and throughout all this portion blue grass grows in great profusion. In many of the other counties it grows as well, but its principal home is in the limestone soil. When once it gets a start it makes a splendid sod, and has a vigorous growth. No soil is too poor for it, and on the mountain side it climbs and reaches to the very tops. Thus hills that are not fit for cultivation produce the best of pasture, and soil which otherwise would be washed off the steep hillsides is held in place by the sod, and barren land is thus reclaimed.

The larger part of the State is splendidly watered, great streams of purest water flowing down from among the mountains through nearly all the counties, and these assist in keeping fresh and green the pasture lands. The excellent grass, the pure fresh air and sparkling water that are found in nearly all parts of the State are conditions unexcelled for raising stock, and West Virginia should become one of the greatest stock raising States in the Union. Already a good deal of attention is paid to stock, and cattle particularly are raised in great numbers. In Harrison, Greenbrier, Monroe, Gilmer and the South Branch counties cattle are raised in large numbers. In the valley of the South Branch, in Hampshire, Hardy, Grant and Pendleton counties, export cattle are raised almost exclusively. For the foreign markets cattle of unusual size are required and in the counties mentioned the largest, finest cattle are raised,

which in the markets of Baltimore and other places command the topmost prices. Statistics are not to be had but in all the counties mentioned, and in many more beside, the raising of cattle is an important branch of agriculture and is conducted with much profit.

Another branch, to which by no means so much attention is given as should be, is dairying. The State possesses all the requisites for a good dairy State. The pasture, nearly always green, the fresh, pure water and the nearness to market make the dairy business profitable. In some sections of the State a few creameries have been erected and with the uniform result of proving very profitable. From Greenbrier county, where a large creamery is located, butter is sent to the principal city markets, while in the summer butter, cream and buttermilk are all supplied to the hotels at the springs in the neighborhood. Last year the company paid a floating debt of several thousand dollars and paid a dividend of ten per cent. besides. At Morgantown the creamery at the Agricultural Experiment Station has proven very profitable and shown without a doubt that West Virginia farmers, if the proper attention were given to dairying, could build up a large and paying business.

Dr. John A. Myers, Director of the Agricultural Experiment Station, in an article on the live stock interests of the State has this to say:

"West Virginia is emphatically a stock-growing State, and farmers who contemplate settling in this State should shape their plans with reference to the development of this industry as their chief source of profit upon the farm. At the same time, butter and cheese may be manufactured in this State of as excellent quality and in as large amounts and with as great ease and as little care as it can be produced in the dairy regions of the north, so that the farmer by combining the diversity of crops that will grow in this section with the live stock industry, either sheep, cattle or horses, with the poultry and dairy interests and the raising of fruits, has an opportunity the whole year round of having something to sell, and of making money in this State that is offered by few, if any other, of the States of the Union. We are most emphatically of the opinion that the freedom from malaria, the rich soil, the pure air, the salubrious climate, fresh spring water, the general freedom from diseases and insect pests, the ready accessibility to the markets, the cheap-

ness of our lands, and the constantly increasing demand for our products, offer inducements to persons wishing to engage in farming in West Virginia superior to most States in the Union."

There is one thing for which the lands of West Virginia are peculiarly adapted, and that is raising sheep. The splendid sod that covers our hills makes the finest pasture, the hills afford a shelter to the sheep from the cold winds of winter, and the land is high and dry which wards off disease and keeps the sheep in excellent condition. There is something in the atmosphere, the water or the grass that tends to produce fine wool and has given the West Virginia sheep a reputation equal to the best in any market. The northern panhandle counties produce the finest wool, which stands at the top of the wool produced anywhere in the United States. In every part of the State where sheep are raised they have always proved profitable. They are easily raised, require but slight attention, and most of the time require no feed except the grass they pick up for themselves. Turned out upon a bare hillside they never fail to find enough grass growing here and there to keep them well supplied with food, and it is a well known fact that land upon which sheep are kept is constantly improving. Bare hillsides that would hardly produce a blade of grass become rich and productive after sheep have been allowed to run upon them. For the farmer who takes proper care and gives the right attention to his sheep there is no more profitable branch of farming. The experience of those who have raised sheep shows this, and with the abundance of grass and the peculiar fitness of the State for raising sheep it is certainly destined to become a great sheep State. The wonder is that more are not now raised.

Horses, though not bred in such numbers as are cattle and sheep, are still raised in goodly numbers in the State. In some of the counties, where much attention is given them, some splendid horses are seen. Long years of breeding have given to horses of other States more speed than those of West Virginia, and still our horses are by no means unknown on the race course. Draught horses are bred in many counties of the State and find a ready market. The abundant grass which fits the State for grazing tends to make horse breeding a profitable business, and the scores of farmers who make this part of their business indicate that there is profit in it.

Hogs are one of the staple products of the farm. With plenty of unused land on which to turn them out they are easily raised, and there is always a good demand for pork and lard and all pork products.

Poultry, raised in a small way, is one of the paying items of every well conducted farm. The chickens, turkeys, geese and ducks, which provide for themselves and need but little care, amply repay all that is bestowed on them. The chickens and eggs that daily go from West Virginia to the larger markets, form no small part of the income of our farmers

TRANSPORTATION.

High and mountainous, the State gives rise to many water courses the eastern shed in the vicinity of Pocahontas and Pendleton counties sending waters into every direction. Rising in the higher portions of the State but few of them attain much size within its bounds, so that, while excellently watered with large streams, but few sections of the State are traversed by navigable waters.

The Ohio river along the western boundary of the State, is the chief water course, affording, except in seasons of low water, transportation facilities for all the country tributary to it. Between Cincinnati and Pittsburg there are daily steamers carrying passengers and freight, while tow-boats push immense fleets of coal barges from the mines above us, along the whole western border of the greatest coal State in the Union and take it to the markets below, where it is sold in competition with the West Virginia coal. The Ohio river affords transportation at the minimum price and is easily reached by at least one-half the State.

The Great Kanawha river is the next in size, and on account of the valuable territory through which it flows the United States government has undertaken the improvement of the river by a system of locks and dams.

In 1873 the improvement was begun and in 1880 the first two locks and dams were comp'eted and put in operation. Since that time five more have been completed and the remaining three which will complete the system and carry slackwater from the mouth of the

river to within 5 miles of Kanawha Falls, have been contracted for. The works are planned to make an available depth of 6½ feet, or full shipping water for coal, at all seasons. The chambers of the locks below Charleston are 342 feet long and 55 feet wide (those above Charleston are 300 by 50 feet) sufficient to admit four large size coal barges The cost of these locks and dams has been as follows: Up to June 30, 1892, there had been appropriated for the first seven of them $2,579,500. On July 13, 1892, a bill was passed by Congress authorizing the remaining three to be put under contract and appropriating $225,000 for work on them. It is estimated that the additional appropriations necessary to complete the system will be about $1,080,700, making the entire cost of the system $3,885,200.

Addison M. Scott, U. S. Resident Engineer, in charge of the improvement, shows in a pamphlet, from which we quote, that the Kanawha river furnishes *the cheapest transportation in the world.* We take the following from his pamphlet on the Coal, Commerce and Development of the Great Kanawha Valley:

The first "movable" dams in America in connection with slack water improvement were built on the Great Kanawha; Nos. 4 and and 5, as stated above, being completed and put in operation in 1880. The usefulness and adaptability of movable dams are thoroughly established, and all on the river below No. 3 are to be of this type.

Movable dams are kept up during low stages and down in high water. Their advantages over the ordinary fixed dams for a commerce and river like the Great Kanawha are decided, furnishing the benefits of the usual slack water without its most serious inconveniences and drawbacks With fixed dams everything must pass through the locks. With them navigation is entirely suspended too when the river is near or above the top of the lock walls The difference between the fixed and movable dams in the scour and wash of the banks about the works, is also greatly in favor of the modern type.

With movable dams the locks are used only when the water in the river is so low as to make them necessary. At all other times the dams are down flat, practically on the river bottom, out of the way, affording unobstructed, open navigation. This is a great advantage to all classes of commerce, and is particularly so with coal,

transported as it is (and empty barges returned), in "fleets" of large barges. More barges can of course be taken by a tow boat and much better time made in "open river," where there is water enough for such navigation, than when the stage or discharge of the river compels the use of the locks.

The gauge record of the Great Kanawha, kept at the U. S. Engineer Office at Charleston, for the last 16 years, shows there are on an average 196 days in the year when there is 5 feet or more of water for "open navigation" from Charleston down; the average for 16 years shows 142 days of 6 feet or more. From this it appears that coal can be shipped by open river on about 6 months of the year, during which time the movable dams will be down. The rest of the time, or in other words, when the river falls below a coal boat stage, the dams will be kept up, and make an available slack water depth of 6 feet.

The manner pursued in shipping coal on the Great Kanawha and Ohio rivers is generally understood and need not be particularly described. It makes remarkably cheap transportation, probably without exception, particularly when length of routes are compared, the lowest inland freight rates in the world.

The coal barges themselves, considering their capacity and service, are cheap carriers; they cost from $800 to $1,200 and last about ten years. The barges are generally 130 feet long, 25 feet wide and 7½ deep. A barge carries from 10,000 to 14,000 bushels, or from 400 to 560 tons; 480 tons, or 12,000 bushels per barge, is a fair average, equal it will be remembered to a train of 24 cars of 20 tons each.

A small tow of 4 barges, easily handled by a small tug or tow boat, and passed through the locks when the dams are up at one lockage, will have nearly or quite 50,000 bushels or 2,000 tons, enough to fill 100 freight cars of 20 tons each.

In open navigation a tow boat handles from 4 to 14 loaded barges in the Kanawha, depending on the stage of the river and the size of the tow boat. In the Ohio river, or from Point Pleasant down, the Great Kanawha tow boats take from 14 to 34 barges. A fleet of 30 barges has about 375,000 bushels or 15,000 tons; this amount of coal loaded into 20 ton cars *would make 30 trains of 25 cars each, or a continuous line of cars nearly five-and-a-half miles long.*

The general rate at present from the Charleston pool to Cincin-

nati is one cent per bushel, or 25 cents per ton. Operators who hire barges pay half a cent a bushel barge rent, making the cost to Cincinnati, to operators who hire both barges and towing, 1½ cents per bushel or 37½ cents per ton. This includes the return of the empty barge to the mine. This rate to Cincinnati (distance from Charleston 263 miles,) is 1.42 mills (or about one-seventh of a cent), per ton per mile. For longer distances, or to points on the Ohio and Mississippi below Cincinnati, the rates per mile are much less. The usual rates from Cincinnati to the mouth of the Kentucky river, Louisville and points between, amount to about 10½ cents per ton, making the cost from the Charleston pool to Louisville, including towing and rent and return of barge, 48 cents per ton. The distance from Charleston to Louisville being 394 miles, makes the rate 1 21 mills per ton-mile.

The above rates, it will be noticed are both for comparatively short distances.

A considerable quantity of the Great Kanawha coal is towed to different points on the lower Mississippi, as far down as New Orleans.

The rate for these long distances is exceedingly low. Take it to New Orleans, for instance; the cost to the Kanawha operator anywhere below Lock 3, who hires both barge and towing, is 5 cents per bushel or $1.25 per ton. The distance from Charleston to New Orleans, 1776 miles, makes the rate .7 mill, *or about one-fourteenth of a cent per ton per mile.*

The next lowest inland rates are undoubtedly those of the Great Lakes of the Northwest, where enormous quantities of heavy freight, such as iron ore, lumber, grain and coal, are carried, mainly by a system of towing in large barges. The average rate on the Lakes in 1888, determined from records kept at the St. Mary's Falls Lock, under direction of Gen. O. M. Poe, Corps of Engineers, was 1½ mills per ton per mile. The average length of route was 806.9 miles. In 1887 the rate was 2.3 mills per ton per mile for an average route of 811.4 miles. *See report of Chief of Engineers for 1889, page 2,220, &c.*

The average railroad rate last year on freight from Chicago to New York (distance 913 miles) was close to $4.50 per ton or 5 mills per ton per mile; the lowest rate on grain was about $4.00 per ton or 4.38 mills per ton per mile.

The rate on all the freight carried by the railroads in the United States in 1889, according to the Inter-State Commerce Commission, averaged 9.22 mills per ton per mile.

Mr. Scott then goes on to show the advantages to be derived from the completion of the system of locks and dams in the Kanawha valley, and concludes that "the continuation of the locks and dams to the mouth of the river will not only nearly or quite double the time for shipping coal, but will, in effect, put the Great Kanawha coal fields about 300 miles nearer to the markets of the lower Ohio and Mississippi valleys."

The Little Kanawha river is navigable for small steamboats from its mouth at Parkersburg to Creston in Wirt county, a distance of 52 miles by river. The river is improved with locks and dams owned and operated by the Little Kanawha Navigation Co

The Big Sandy river on the south-western border of the State is navigable up as far as Logan county in certain seasons of the year.

The Monongahela river which is improved by locks and dams is navigable from Pittsburgh up through Pennsylvania as far as Morgantown in Monongalia county.

Other rivers in the State are navigable for flat boats, "push boats" and canoes but are not fit for steam navigation. In times of freshets, though, there is scarcely a stream of any size within the State which does not bring out a large supply of logs and ties. With transportation of this kind every county in the State is well supplied.

RAILROADS.

Twenty years ago there were scarcely a dozen counties in the State which were penetrated by a railroad. Today, of the 54 counties there are but 11 which have no railroad, and in the direction of every one of these new roads are now projected, so that within the next few years probably every county in the State will be upon the line of at least one railroad. For many years after the B. & O. first pushed westward through the State but little more was done in railroad building, but twenty years have made a wonderful change. The wealth of the hidden treasures of the State has been made known, the possibilities of the State have been realized, the demands for transportation been perceived and the construction of

railroads in the State has so increased that last year in no other State in the Union were there as many miles of railroads built as here in West Virginia. We led the entire United States in railroad construction. This fact alone will show the estimation in which the resources of West Virginia are held by capitalists who have most thoroughly investigated before investing. Millions of dollars are not poured blindly into any scheme, and the fact that many millions have been spent by the best financiers in the world in building West Virginia railroads shows beyond a doubt the value of our resources and the future there must be in store for the State.

The oldest and the longest line of railroad in the State is the Baltimore and Ohio, which after more than a quarter of a century of experience in the State is so well satisfied with its investment and the prospects for the future that it is now engaged in buying up all the small railroads which connect with it and extending them on further into the undeveloped portions of the State. The main line of the great Baltimore and Ohio system, coming west from Baltimore, enters West Virginia at Harper's Ferry, on the extreme east of the State, follows up the Potomac river, sometimes in this State, sometimes in Maryland, through the counties of Jefferson, Berkeley, Morgan, Hampshire and Mineral, then passing into Maryland comes back to West Virginia in Preston county, thence through Taylor, Marion, Wetzel, Marshall and Ohio, into Wheeling, and on beyond to Chicago and the west. From Grafton, in Taylor county, a branch of the same road runs west to Parkersburg and thence to Cincinnati. At Harper's Ferry the Valley branch of the road runs up the Valley of Virginia to Staunton and Lexington, Va. A short branch connects the Berkeley Springs with the main line in Morgan county; another connects with Romney, in Hampshire county. Kingwood, the county seat of Preston is on a narrow gauge road, connecting with the B. & O., and so is Ritchie C. H. A few other short lines connect with the B. & O., while at Grafton a branch runs south, up the Tygart's Valley to Belington, to a connection with the West Virginia Central and Pittsburg. Another branch runs down from Fairmont to Morgantown and is being extended on down the river to a Pittsburg connection. From Clarksburg, the W. Va. & P., built with bonds guaranteed by the B. & O., extends on southward through Lewis, Upshur, Braxton and Webster counties, into per-

haps the finest timber region in the State. The Monongahela River railroad connects Fairmont and Clarksburg and the Pittsburg branch of the B. & O. leaves Wheeling eastward through Ohio county towards Pittsburg. The Pittsburg, Cincinnati, Chicago and St. Louis connects Wheeling and the Panhandle counties with Pittsburg and the west.

The West Virginia Central and Pittsburg follows the Potomac river from Cumberland Md., to its source and thence through Randolph county into Barbour to a connection with the B. & O.

The Cumberland Valley railroad connecting Harrisburg, Pa., with Winchester, Va., passes through Berkeley county and Martinsburg.

The Ohio River Railroad is the only line connecting the east and west lines of the State. It runs from Wheeling to Kenova along the Ohio river all the way. It has branches to Spencer and to Jackson Court House.

The Chesapeake & Ohio is the next great east and west line, entering the State at the southwest corner and passing through Wayne, Cabell, Putnam, Kanawha, Fayette, Summers, Greenbrier and Monroe, connecting Cincinnati and Chicago with the seaboard at Newport News, Va., and with Washington and New York. A half a dozen short line railroads connect with this along the line, principally coal roads from the mines to the C. & O.

The Kanawha & Michigan, a portion of the Ohio Central system, enters the State at Point Pleasant and follows the Kanawha river, up by Charleston to the mouth of the Gauley river, where it connects with the C. & O. Another line is thus afforded from Toledo and northern Ohio to the East.

From Charleston up Elk river runs the Charleston, Clendennin & Sutton railroad, built by Charleston local capital, for twenty miles, and soon to be completed on to Sutton, there to connect with the W. Va and P., and make another north and south line through the State.

The Norfolk & Western, the great developer of southern West Virginia, enters at Kenova from Columbus and Chicago, passes through Wayne, Logan, Wyoming, Mercer and McDowell counties and on through old Virginia to tidewater at Norfolk. Another branch following down the Shenandoah valley passes north and south through Jefferson county.

Numerous short line roads are in the State, but all are local roads and will be referred to in the description of the counties where they are located.

OPENINGS FOR RAILROADS.

With all the roads the State now has, there is ample room for many more. Freight facilities are scarcely yet sufficient and the opening of new regions by new railroads always builds up business along the line. In many portions of the State new roads might be built to advantage, but some regions are especially in need of railroads, a few of which we mention.

One of the richest sections of the State, the valley of the South Branch of the Potomac, is entirely without a railroad. Along the northern border of Hampshire county and up the valley 16 miles to Romney runs the Baltimore and Ohio, but the rest of the distance through the counties of Hampshire, Hardy, Grant and Pendleton is one of the richest agricultural regions in the State, with mountains on the borders full of iron ores, and covered with timber, while fresh pure water and mineral springs pour out from beneath the rocks. The descent of the river is gradual and the grading of a railroad up the valley could be done at very little cost. There is now a project for a road from Cumberland, Md., up Patterson's creek to Franklin, and through the Petersburg gap to Moorefield. It is said that there is enough tanbark alone in Pendleton county to pay the entire cost of a railroad to the county.

Pocahontas county is another very rich in all the resources of the State except coal, and it is now without a railroad. With splendid farming land, the finest timber and valuable mineral resources a railroad would develop the county wonderfully and build up for itself a splendid business. Extensions of the West Virginia and Pittsburg and of the C. & O. are contemplated. The road that would develop Pocahontas should also pass through Greenbrier, one of the finest counties in the State.

A short line from Hinton up the New River to connect the C. & O. and N. & W. would undoubtedly pay.

The road already started up Elk river from Charleston to connect with the W. Va. & P. and B. & O. will be a much used road.

Already the first 20 miles are paying well, though in use but little more than a month.

Coal river drains the finest coal basin in the State and the railroad that first gets into that field will reap a fortune. From Boone to Wyoming counties a railroad could be built beneath a mountain, through a coal vein, the coal from which would pay the entire cost of making the tunnel. Such a road could be made to connect with the C. & O. at one end, the N. & W. at the other and would be a profitable road. Steps are now being taken to build a road up the river from its mouth near Charleston.

The Guyandotte river, flowing through Wyoming, Logan, Lincoln and Cabell drains much the same kind of a country and several roads have been projected from Huntington up. The country along its banks is filled with valuable coal and covered with timber. A road up it would certainly pay well.

The Little Kanawha valley, from Parkersburg up through Wood, Wirt, Calhoun and Gilmer, is a rich agricultural country, and the splendid coal veins of Gilmer would be tapped by a road up this valley. It is a road that should be built, and doubtless will be soon.

These are by no means all the roads that should be built, but with them completed nearly all the counties would be well supplied with transportation, and the others could follow later. Railroad building is by no means ended in this State, and those that have been built but show what may be done. Other roads are needed, and there is no more money to be made in any way than by purchasing cheap wild lands in West Virginia and developing them by building railroads into them.

THE STATE IN DETAIL.

BARBOUR COUNTY.

LOCATION AND CHARACTER.—Situated slightly to the northeast of the center of the State, Barbour county lies at the base of the Laurel mountains, the westernmost of the numerous ranges of the Appalachian system which parallel the main Alleghany range. Through the center of the county from south to north flows the Tygart's Valley river, along the east bank of which a railroad extends from one end of the county to the other. Philippi, the county seat, situated near the center of the county, is distant by rail from Wheeling 124 miles, Parkersburg 128, Martinsburg 204, Baltimore 318, Pittsburg 195, Cincinnati 323, Chicago 590. The county is in the main hilly with narrow valleys, but the hills are neither high nor steep. Timber, coal, iron, manganese and fire clays are the principal productions of the county, and aside from the farming interests comprise the chief sources of wealth.

TIMBER.—As yet but a small part of the county has been cleared, fully one-half of it remaining covered with timber. Oak and poplar are the principal woods, hickory and maple are abundant and the usual other woods found in the forests with these are found. The poplar timber is especially fine and some magnificent specimens are found. Lands from which the largest poplars were long since taken off are still considered fine timber lands, trees which were at first rejected being now equal to the best found in many other sections. The Buckhannon and Middle Fork rivers and numerous

smaller streams empty into the Tygart's Valley river which, flowing through the entire length of the county, affords cheap and easy transportation of timber to suitable sawing and shipping points. The West Virginia Central and Pittsburg railroad in the southern part of the county, and the Baltimore and Ohio railroad through the center afford ample means of railroad transportation and much timber is sawed along these lines. The estimated amount of timber standing in Barbour county at $10 per acre would be worth $1,280,000.

COAL.—Though not generally known Barbour county is abundantly supplied with coal. There is not a section of the county without it, and though none has ever yet been mined, save for domestic consumption, nearly every property owner in the county has his own coal bank. What is known as the Roaring Creek coal underlies the entire county. At Roaring Creek, in the western part of Randolph county, near the Barbour line, this coal is in veins piled one above the other until the coal reaches a thickness of from 16 to 30 feet. West of this these veins separate, the distances between them increasing to as much as 30 feet or more. But though in veins of only 5 to 12 feet and widely separated the aggregate thickness is still retained. In many places the coal is found cropping out of the mountain side, in others, especially in the northwest, toward which the coal dips, the veins are under ground, the top one 30 feet or more below the surface. In this northwest portion of the county, where the strata dip low, another vein—the Pittsburg coal—is found in a vein about 7 feet thick and above the other. Both are good coking coals and could be easily mined.

IRON.—In a comparatively small area in the northeastern part of the county iron ores are found. A 24-foot vein of spathose ore has been found over about 8,000 acres of land. Spathose ore is never very rich in iron and while this contains about as large a percentage of iron as this kind of ore ever does—40 per cent—it is very low in phosphorus and sulphur, containing but .04 of one per cent. of the former and but a trace of the latter.

A hydrated brown oxide of iron is found in a four foot ledge over some 1,200 acres in the same portion of the county. This contains 59.86 per cent. of iron and but .12 of one per cent. of phosphorus. This is a very close, fine grained ore, so fine that it takes a polish

like marble. It makes a very close grained, tenacious metal and was manufactured before the war to a considerable extent. In some of the homes of the county kitchen utensils are still in use which were made in a Barbour county iron furnace over thirty years ago.

There are also a 7-foot vein of black band iron ore and a 6½-foot vein of argillaceous ore that have never been analyzed but exist in considerable quantities.

MANGANESE, CLAY AND OIL.—In the same vicinity in which the iron is found there is a 5-foot vein of manganese ore which analyzes 35 per cent. manganese, 24 per cent. iron, .09 of one per cent. phosphorus and shows merely a trace of sulphur.

A bed of fire clay has been found which is very fine grained and hard and makes excellent bricks and tiling. It extends over a distance of several miles and has been opened to a depth of 7 feet. How much thicker it is, is not known.

An oil well has recently been put down near the county seat and oil was found, though to what extent can not be ascertained from the company.

AGRICULTURAL.—The best farming land is in that portion of the county west of the Tygart's Valley river. The soil is rich, the mountains are not steep, and while the valleys are few and narrow the hills are fertile and make good grass sod. Some of them are farmed and when tilled yield well, but little attention is paid to farming, not enough grain being raised for home consumption. Most of the cleared lands are in grass which springs up naturally, grows thick and tall and makes good hay. Cattle raising is the principal agricultural pursuit, fine large cattle are raised in great numbers and vast herds are shipped out of the county every year. A few horses are raised and some attention is paid to sheep, though not so much as might be profitably.

BERKELEY COUNTY.

LOCATION AND CHARACTER.—In the extreme eastern part of West Virginia, almost separated from the rest of the State by Virginia and Maryland which nearly surround them are three counties, the last to dissolve their relations with old Virginia and to be admitted as part of the new State. The central one of these is Berkeley. It lies at the northern end of the famous Valley of Virginia, which is

among the finest agricultural regions in either of the Virginias. The county is about 25 miles long with Maryland on the north and Virginia on the south. The Baltimore and Ohio railroad connects the county with the east and west, the Cumberland Valley railroad with the north and south, and the Chesapeake and Ohio canal with all points between Cumberland, Md., and Washington, D. C. The distance from Martinsburg, the county-seat, to Washington is 74 miles, to Baltimore 100, to Parkersburg 284, to Wheeling 280, to Cincinnati 479, to Chicago 746 miles.

The county embraces almost every variety of land to be found in the State. The Sleepy Creek mountain is on the west and the Potomac river on the north and east and between them is every variety of soil from the alluvium and loam of the river bottom, through clays, sand and limestones to the shales and conglomerates of the mountains, underlaid in many places with marl and phosphates of much value though undeveloped. Though Berkeley county is in the earliest settled portion of what is now West Virginia, and contains the fourth city in the State in population, still it is undeveloped as to its natural resources and in parts so nearly uninhabited that there is one strip of 16 miles between two mountain ranges in the western part of the county in which there is but one house. The climate is mild and wholesome, the mountains on the west protecting the county from the severity of winter and the intensity of the summer heat.

COAL.—It has long been known that there was a little anthracite coal in Berkeley county, but recently further investigations have proven that it exists along one mountain range in Berkeley and Morgan counties for a distance of some 25 miles at least. At intervals along this mountain as many as 35 openings have been made and each one disclosed the same vein of coal. It is a very good quality of anthracite coal and when developed will be the means of bringing a good deal of money into the county. There is no bituminous coal in the county.

IRON.—In many portions of the county iron ore is found in considerable quantities and a good deal is taken from the county to other places to mix with the ores found and used in the furnaces there. In the northern and western portions of the county the ore

is principally brown hematite. Some specular iron ore is found, and near Martinsburg a fine quality of pipe ore has been mined.

OTHER MINERALS.– Some manganese has been found though the extent of the deposit is not known.

Indications of some other minerals have been found such as gold, silver, copper and lead, but they are not found in paying quantities and no faith is placed in the value of the deposits.

LIMESTONE AND CLAY.—Limestone of a very excellent quality is abundant throughout the county and is largely manufactured into lime. Berkeley county lime stands high, commands a good price and finds a ready market. There are several large lime kilns in the county and plenty of stone to supply numerous others.

There is an abundance of building stone throughout the county, a semi-marble limestone which is found making a very fine stone for building purposes

Fire clay is found along with the anthracite coal and a very fine quality of soapstone, but they have never been developed.

There is a fine quality of potter's clay in the county which has been manufactured into pottery for many years at Martinsburg.

TIMBER.—The county having been settled so many years the timber is pretty well cut off. What is left, which covers not more than a third of the county, is principally hard wood. Some pine is found and considerable very fine poplar. Oak is still found in large quantities and is in good demand for the export trade, being near tidewater, and of excellent quality. A great deal of second growth hickory is found, suitable for spokes, handles, etc., and its manufacture would be a profitable business.

AGRICULTURAL —Except in the mountains the soil of the county is admirably adapted to agriculture Half a dozen streams flow through the county, watering it well in every portion. The hill lands are sowed in grass, and horses, cattle and sheep are raised, particularly the latter, which are more profitable. The county is an excellent one for sheep raising, and more attention will undoubtedly be paid to it in the future

A portion of the fertile Valley of Virginia, the county is unsurpassed for farming. Wheat and all the other cereals yield well and farming forms the principal occupation of the people.

Much of the county seems especially adapted for fruit culture,

and thousands of peach and apple trees are already yielding annually large returns to the orchard owners.

The fertility of the soil, the absence of steep mountains and the nearness to markets make this county a desirable one for farming, and there is plenty of good land that may be secured, ranging in price from $8 to $100 per acre for improved land, or averaging about $30. Wild lands range from $2 to $10 per acre, averaging about $5.

MARTINSBURG, the county seat, is shown by the last census to be the fourth city in the State, with a population of 7,226, an increase of 14.06 per cent. in the last ten years. It is the center of a rich agricultural section and is assuming large proportions as a manufacturing city. The large distillery alone pays out in taxes, wages, etc., some $2,000 a day. Knitting factories, wood working establishments, grain elevators and flour mills are the principal industrial establishments. The city has macadamized streets, street railway, electric light, gas, water works and sewerage.

BOONE COUNTY.

LOCATION AND CHARACTER.—Boone county lies in the south-western portion of the State. The Kanawha river on the north, the Guyandotte and Big Sandy on the south flow almost parallel to each other, while Big and Little Coal flow through the entire length of Boone county in the same general direction until they unite just beyond the county line and flow north into the Kanawha 12 miles below Charleston. On either side of each of these streams are dividing ridges, so that the surface of Boone is principally mountainous, the ridges almost parallel. The fall in the rivers is very slight and the valleys, though narrow, afford ample room for a railroad which could be built along these water courses with easy grades from one end of the county to the other. At present the county is without a railroad and the nearest railroad point is Brownstown, 30 miles distant from Boone Court House. From Brownstown to Charleston by rail is 10 miles, to Huntington 60, to Richmond 359, to Cincinnati 221, to Chicago 526.

Before the war, that bloody period from which so many events in the south are dated, Boone county was undergoing a rapid development which has never been equalled since. Big Coal river from its mouth to Peytona, some 30 miles, was locked and dammed, making

it navigable for boats and barges. A railroad several miles in length connected rich cannel coal mines with Peytona and the river and great quantities of coal were mined and shipped. Then came the war, property was destroyed, the dams were broken, the railroad went to decay and Boone county is now in as primitive a state as it ever was. But it is not destined to remain so. So richly endowed with natural resources as it is, Boone county can not long remain backward and it will be but a short time till it is the scene of as much activity as any other county in the State.

COAL.—Boone county is undoubtedly one of the richest counties in the State in coal. The chief of a geological corps, after spending six or eight weeks investigating Boone county coal, exclaimed that it seemed as if the Almighty after sprinkling his coal around in the rest of West Virginia had set his basket down in Boone county. Splint, cannel, bituminous and coking coals are all found in Boone, in inexhaustible quantities in thick and numerous veins.

Prof. W. M. Fontaine, of the University of Virginia, says that "apparently the Kanawha coals reach their maximum in thickness and good qualities in the Coal River district. The Kanawha coals here meant are those that display themselves between Kanawha Falls and Charleston. They are highly bituminous and contain both splint and cannel. In the Coal River district I believe the cream of these exist. They dip gently to the northwest, are undisturbed, and lie mostly in hills and mountains formed by erosion. As they are pretty high above the streams, they are favorably situated for working by gravity, at the same time they have sufficient coping to give safe roofs.

"Beneath the level of the streams the New River coking coals are to be found, and can be reached by shafting."

Prof. I. C. White, of the West Virginia University, says: "In Wayne, Lincoln and Boone the Upper Freeport coal forms one of the largest areas of pure cannel known in any country of the world."

One mountain on the Pond fork of Big Coal river, 1350 feet high, contains no less than eleven veins of coal ranging from 2 feet 7 inches to 20 feet in thickness, and aggregating 68 feet 11 inches of coal from top to bottom. One vein is pure cannel coal 42 inches thick; another vein has 34 inches of pure cannel coal overlaid with splint coal; one vein is 20 feet thick with 2 feet of parting 7 feet

from the floor; one vein four feet thick is supposed to be the "Eagle" vein, from which coke is made at Eagle in the Kanawha Valley.

Another mountain in the same county was examined by an engineer who reported as follows:

"Beginning at the base of the mountain is seam No. 1, 2 feet 7 inches of gas and coking coal, and 30 feet above this is my No. 2 of the same quality, 3 feet 8 inches of coal, and on above is 3 feet 4 inches of gas coal No. 3. Then comes No. 4, 3 feet 10 inches fine splint. No. 5 is 2 feet 7 inches fine coal; No 6 is 10 feet 6 inches, but with only 9 feet available; No. 7 is 5 feet, including 1 foot cannel; No. 8 is 5 feet coal; No. 9 is 9 feet coal; No. 10 is 22 feet high, to-wit: 13 feet coal, 2 feet slate and 7 feet coal. I also found 10 or 12 small veins which seem to have been split from the others."

These ten or eleven seams of coal extend over the entire county, and beneath them all, be it remembered, are the New River coals.

The cannel coal of Boone county is of two kinds—the smooth black and the "bird's eye," and is in veins from 3 to 6 feet thick. The bituminous coal equals the best found in Pennsylvania, while the splint coal for fuel or shipping purposes is unsurpassed. The value of the cannel coal in this and adjoining counties can hardly be estimated though some idea may be gained when it is known that the only other cannel coal vein in the southern part of the State yields the owner a royalty of 2 cents a bushel or about $2,000 per acre.

TIMBER.—An enormous amount of timber has been taken out of Big and Little Coal and their tributaries annually for many years and yet is estimated that fully one half the poplar timber of the county remains untouched and three fourths of all the other kinds. As rapidly as it is being taken out, the timber will last for many years to come. One man has a contract for clearing a single tract which it is estimated will require ten years for its completion. The principal forest trees are poplar, walnut, oaks, ash, hickory, maple, beech, birch, lynn, pine, hemlock, cherry, chestnut and locust. Poplar and walnut timber is especially fine in Boone and trees of enormous size are reported quite often.

A poplar tree was cut in 1889 on the waters of Big Coal river in Boone county, the dimensions of which are given by Maj. Thos. L.

Broun, of Charleston, as follows: The tree measured eight feet and nine inches in diameter at the base, and the distance from the ground to the first limb was seventy-one feet. From the tree were cut six logs, each twelve feet in length, the diameters of which at the small ends were respectively seven feet, four inches; seven feet; six feet, eight inches; six feet, one inch; five feet, nine inches and five feet, six inches. The market value of the lumber cut from the one tree was $186.

Wm. C. Reynolds, civil engineer, says: "I found on the West fork near the head and over one thousand feet above the foot of the mountain, a walnut tree eight feet in diameter and tall enough to furnish half a dozen average length logs."

By means of splash dams logs may be gotten from the remotest parts of the county into the rivers and then readily floated to market.

IRON AND CLAY.—Iron ore may be found in considerable quantities, principally black band, gray and red hematite ores. The value and extent of these ores is not known, no investigations having ever been made.

Excellent fire clay is found in abundance and has, until recently, been made into vessels at two potteries, but want of transportation facilities shut them up.

Good building stone is found throughout the county.

AGRICULTURAL.—The entire county has fewer people than either one of the largest five cities in the State, and less than a fourth of the county has ever been cleared, so that it may readily be seen that little farming has ever been done. But there are great opportunities. Lands that produce such fine poplar and walnut timber as Boone lands do, are more than usually fertile. Corn is the principal crop now, though the soil is well adapted to tobacco and grass. No better country could be found for cattle or sheep raising than in Boone county. The soil and climate also make it an excellent county for fruit culture.

BRAXTON COUNTY.

LOCATION AND CHARACTER.—Braxton is the central county of the State, from which fact a station on the new railroad takes its name—

Centralia. Sutton, the county seat, is 100 miles by river from Charleston, from which place until recently all the Braxton supplies were taken in push boats. Now the West Virginia and Pittsburg railroad reaches Sutton, and the Gauley branch, completed within a few months, extends through the eastern part of the county into Webster and on to Gauley river, whence an eastern connection will undoubtedly soon be made. Sutton is now distant by rail from Parkersburg 151 miles, from Martinsburg 272, from Baltimore 386, from Wheeling 192, from Pittsburg 263, from Cincinnati 346 and from Chicago 658 miles.

The entire county is high, portions of it hilly and even mountainous, but a large part is merely a high plateau through which the streams flow deep down below the level of the lands. Five rivers have their courses through this county—Elk, Little Kanawha, Big and Little Birch and Holly—by means of which and their tributary streams the entire county is well watered, and excellent water power afforded for manufacturing purposes.

Hitherto unfavorably situated for development, Braxton's advantages have not received the attention they deserved, but with the completion of the railroad through the county and the prospects of the building of a railroad from Charleston, which is already completed a portion of the way, with Sutton as its destination, development must follow, and the resources of the county will soon command their share of public attention. Some counties may have better coal than Braxton, others better iron or better farming lands, but as an all round county Braxton is not surpassed by any other in the State. The gifts of nature have been bestowed with a lavish hand and Braxton will stand high in the list of counties from any stand point.

COAL.—The entire county is underlaid with valuable coal in great abundance. The Lower, Barren and Upper coal measures are all found in Braxton and are very prolific. In the western portion of the county in the Upper coal measures the Pittsburg or Connellsville seam of coking coal is found along with several others ranging from 2½ to 16 feet in thickness. These coals have been tested and are reported to be as fine for coking purposes as any in the State. In the eastern part are the Lower coal measures where the Thomas and Davis seams, which are mined along the West Virginia Central rail-

road, and which make excellent coke, appear again in 5 and 6 foot veins. Splint, peacock and cannel coals are also found, giving to Braxton as great a variety and as good coal as any county in the State.

IRON.—In the southern part of the county iron is found and has been manufactured. At the mouth of Strange creek, on Elk river, 25 miles from Sutton, the old charcoal blast furnace is still standing where ten years ago pig iron was made. It was floated down Elk to Charleston and shipped from there to Cincinnati where it was used for the manufacture of car wheels, and the iron found to be of good quality. But the cost of shipping down Elk, which is navigable for small bateaux only, was too great and prevented its further manufacture. The ores found are black band, kidney, red and gray hematite. There is plenty of excellent coking coal and good limestone in close proximity to the iron which should render the making of iron cheap and profitable when cheap transportation is secured.

TIMBER.—Probably one-half of Braxton county is still clothed in the original forests among which some of the most magnificent timber in the State is to be found. A great deal of the very finest quality has been cut out, but only the most accessible, and large tracts in all parts of the county remain untouched. All the varieties common to the altitude and latitude of the county are found. Poplar and the various kinds of oak are the most plentiful, though there is an abundance of hickory, ash, maple and some walnut. The latter, however, is pretty well exhausted. The poplar of this county is remarkably fine, the rich soil having produced a very large growth and the trees reach enormous proportions. The oak timber is also very fine and in much demand. There are a number of saw mills within the county which cut daily hundreds of thousands of feet of lumber, but the larger part of the timber now used is floated down the Elk and sawed up at points nearer to the lumber markets. The water courses above mentioned furnish ample means of getting the timber from every portion of the county cheaply to market.

AGRICULTURAL.—This is one of the best agricultural counties in the State. With a small part of the county cleared of timber there has as yet been but little opportunity for Braxton to gain much of a reputation as a farming county, but the soil is good and what farming has been done shows conclusively what may be done

and that Braxton will some day become one of the principal agricultural counties of the State. The soil is fertile, the climate good. Wheat, corn and all the other cereals yield well, and a magnificent growth of blue grass clothes the hills as soon as the timber is taken off. Farming of all kinds is profitable and largely engaged in, but grazing and stock raising pay better than the cultivation of the soil. The soil is black loam and red clay enriched through most of the county with a light stratum of limestone, and well adapted for the production of fine grasses. Timothy and clover are sowed, but the blue grass soon drives them out and forms an excellent sod. Pasturage is plentiful from early in the spring until midwinter. Four months feeding out of the year is all that is ever required for cattle, and frequently, in favorable seasons, cattle run at large all winter. Considerable attention is paid to sheep which yield fine wool and prove quite profitable. The lands are high and rich and consequently Braxton is in a fine fruit growing region.

BROOKE COUNTY.

LOCATION AND CHARACTER.—Brooke, the smallest county in the State, lies in that narrow strip of West Virginia known as the northern panhandle. But one county of the State is north of it, on the east is Pennsylvania, on the west Ohio. The average width of the county is about 7 miles, its length about a d ozen. Along the western border for the entire length of the county flows the Ohio river along the banks of which runs the Pittsburg, Cincinnati, Chicago and St. Louis railroad, which follows along the northern boundary of the county and goes east into Pittsburg. Wellsburg, the county seat is 16 miles from Wheeling, 50 from Pittsburg, 279 from Cincinnati and 473 from Chicago. Close to the railroad centres, Pittsburg and Wheeling, and upon the Ohio river, the county enjoys cheap transportation rates for its people and products in all directions. The Ohio river bottoms are wide and level, the country back from the river is rolling, but no part of it so high or steep as to be unfitted for cultivation. Several creeks cross the county, and flow into the Ohio, watering the lands well and giving good water power.

COAL.—Brooke is abundantly supplied with coal which is found over the entire county, but has been little developed. A 4½ foot

vein of the Pittsburg seam is mined, but principally for home consumption. The report of the Mine Inspector shows that for the year ending June 30, 1891, 52 employes dug from two mines 33,999 tons of coal. This vein is found in the hills above the surface of the earth. Two other veins are found beneath the surface, a 5 foot vein at 200 feet and a 6 foot vein at 600 feet. Boring for gas at Wellsburg showed a 6 foot vein at 145 feet, but at other places it is not reported and is probably valueless. Little has been done hitherto to develop the coal, but recently a large purchase of coal lands has been made by a company which proposes to develop it extensively.

CLAYS AND STONE.—The fire clays which are so extensively used in the adjoining county of Hancock are deep under ground in Brooke, but could easily be gotten out by shafting. Three veins of clay have been found and tested and are equal in all respects to those worked north of Brooke. The first vein, 22 feet thick, is found about 115 feet below the surface; the second, 40 feet in thickness, 150 feet below, the third at 200 feet is 17 feet thick.

Limestone is plentiful throughout the county and lime is made.

The Ohio river bed furnishes an abundant supply of building sand, and building stone of excellent quality is quarried in various parts of the county.

TIMBER.—The marketable timber of the county is about exhausted. There is some oak left, but scarcely more than enough for fencing and other farming purposes. There is still some walnut timber left, though in the past year or two much of that has been removed. But aside from this there is little timber left—none of any consequence.

AGRICULTURAL.—Brooke is one of the best agricultural counties in the State. A large part of it is Ohio river bottom land, the rest almost as good and the entire county is in a very complete state of cultivation. Wheat and corn and garden stuffs are raised and excellent fruits. These all yield well, the garden stuffs and fruits finding ready market in the cities close at hand. Sheep raising and grazing are the principal agricultural pursuits. The county is a limestone one and the blue grass is almost as fine as that of Kentucky. The panhandle is widely known for its sheep and wool, the quality of the wool being particularly fine, and Brooke county is about the

best of the panhandle counties in this respect. A great many sheep are raised, the annual wool clip in the county being about 200,000 pounds, all of which brings prices equal to the best wool in the market. Cattle and horses are raised to some extent and the stock of all kinds is being very much improved.

WELLSBURG, the county seat, is a manufacturing town where glass, straw paper, paper sacks, cigars and other articles are made, has foundries, machine shops, etc. The streets are paved with brick, and are well lighted. This city had when the census of 1890 was taken, 2,325 population, an increase of 23.14 per cent in ten years.

CABELL COUNTY.

LOCATION AND CHARACTER.—Wayne is the westernmost county of the State and Cabell adjoins it on the north and east. For thirty-five or forty miles the county is bounded on the north-west by the Ohio river. From the south-east through the county flows the Guyandotte river, its mouth at Guyandotte on the Ohio river. It is not sufficiently large to admit of steamboat navigation but on its waters ply the push boats that form such an important part of the smaller river navigation in this State. These are small flat bottom boats of light draught which carry large loads of provisions and are pushed along the river by men with poles. Canoes are also used on the river and log rafts bring out on every rise innumerable logs. The Guyandotte river for its entire length flows through most excellent timber forests and though, for years, the timber has been coming out, as yet but little has been done to denude the hills and valleys of the timber that so richly clothes them, and every rise now brings out immense rafts of logs and ties and timber. A sudden rise a year ago brought out all the logs for miles above the river's mouth and piled them up against a gorge which formed just at the mouth. As far as one could see the river was one solid mass of logs, jammed so tight together that it took a month after the gorge was broken to get the logs apart, using a steam engine to pull them out with. It was estimated that there were 75,000 logs in the river at one time. And this is how the Guyandotte principally benefits Cabell county. The Mud river and other smaller streams flow into the Guyandotte and help to water the county. From east to west through the center of the county runs the Chesapeake and Ohio railroad. From the Great Ka-

nawha to Huntington the C. & O. follows a low valley which is supposed at one time to have been the bed of the Kanawha river which then emptied into the Ohio at Huntington some 40 miles below its present mouth. The main line of the C. & O. connects the county directly with Cincinnati, Richmond and Washington; a branch of the same connects with Lexington and Louisville, Ky.; the Ohio River Railroad connects with Wheeling and the northern part of the State, while the Huntington and Big Sandy, a short line road, connects Huntington with the Norfolk & Western at Kenova. Huntington, the county seat, is 50 miles from Charleston, 121 from Parkersburg, 215 from Wheeling, 415 from Richmond, 161 from Cincinnati and 466 from Chicago.

The county is principally rolling. The Ohio river bottoms, broad and fertile, along the western part of the county are bordered by a row of hills, back of which the county is undulating and good for farming.

COAL.—Little coal is found in Cabell and less has ever been dug. Bordering along the splendid coal fields of Lincoln, Wayne and the counties east of them, some coal extends into Cabell, but it is of no great value and the veins are small. Beneath the surface the coals that underlie many of the counties of the State would probably be found. The county is sufficiently close to the coal fields of the State to be amply and cheaply supplied with all it needs.

STONE.—Building stone is found in the county, very desirable in quality and appearance. Its use is frequent in the buildings being erected in the city of Huntington and elsewhere. Sand and other building material are abundant.

CLAY.—Good fire and brick clay is found in abundance in the county, and many brick are made. At Huntington a paving brick company is making brick for paving, while in various parts of the county splendid bricks are made and in large numbers. Fire clay is not now used though there is much of it.

Ochre has been found in small deposits in the county, but not in available quantities.

TIMBER.—Much of the best timber of the county has been removed, but still perhaps a third of the county is yet in woodlands. Along the streams and in the more thickly settled portions of the

county the timber is about all gone. Oak is the principal wood remaining.

AGRICULTURAL.—Cabell is a splendid farming county. The broad Ohio river bottoms extending along the entire western portion of the county are unsurpassed for all kinds of farming. Magnificent wheat crops are grown upon them and other crops, corn, grass, vegetables, etc., grow well. The hills produce good grass and are not high or steep, making most excellent grazing lands, and considerable attention is given to stock. Outside of Huntington, the principal city, the chief interests of the county are in agriculture.

HUNTINGTON, the second city in the State in population, had, by the census of 1890, 10,108 people, a gain of 218.46 per cent in ten years. Its growth has been phenomenal. But twenty-one years of age the city now has fully 15,000 people, while the town of Guyandotte on one side of it and Central City on the other, will add at least two thousand more. The city is chiefly a manufacturing one, employing in the different industrial plants no less than 2,500 men. Car building and repairing shops, wood and stone working houses, glass factories, a large brewery, flouring mills, foundries and other enterprises make up the list of industrial plants. The city has broad and well paved streets, sewerage, electric light and power, gas, water works, a good fire department, electric and horse cars, many handsome buildings and plenty of room to grow.

CALHOUN COUNTY.

LOCATION AND CHARACTER.—The southern end of Calhoun touches the western side of Braxton, the central county of the State. Through the northern portion of it flows the Little Kanawha river, navigable from its mouth to Creston, a few miles within the Calhoun county line, and sometimes farther up. Through the entire southern and western parts of the county flows the West Fork, reaching the Little Kanawha just below the edge of Calhoun county. The county is hilly, almost mountainous in some portions, but the hills are not steep, and there are few that are not suitable for pasture, if not for farming. Grantsville, the county seat, is about 70 miles by river from Parkersburg, its most available railroad point, making Grantsville 164 miles from Wheeling, 468 from Baltimore, 265 from Cincinnati, and 570 from Chicago. Numerous railroads have

been projected at various times to follow the Little Kanawha valley and thus pass through Calhoun, but none has yet been built.

COAL.—In the southern portion a little coal is found in the hillsides above the water level, but in most of the county none is to be found above the surface of the earth. The entire county is underlaid with coal some 60 feet or more below the ground. At Grantsville a 7 foot vein of coal was found 70 feet under ground, but none has ever been mined either for domestic use or for shipment. The coal is good, and a 70 foot shaft might easily be constructed, so that, were transportation facilities afforded, the Calhoun coal fields might be profitably operated.

IRON.—Surface specimens of iron ore may be found in almost any part of the county, but the extent or value of the ore has never been ascertained. A gentleman who has investigated the entire Little Kanawha valley, says: "Just at the county line on the left bank of the Little Kanawha, is a mountain, or rather a high hill, which is underlaid with iron. So powerful is the magnetic attraction that no storm accompanied with lightning passes over this mountain without balls of fire shattering the trees. This has been constantly noticed. The needle of the compass will not settle when near it, and fine specimens of iron ore have been found on these lands."

OIL.—It is thought that oil may be found in Calhoun. Signs of it have already been seen, and this, with the fact that it is found in such quantities in Wirt county on the west, Ritchie on the north, and that some has been found in Gilmer on the east, gives rise to the opinion.

TIMBER.—Fully one half the county is still covered with the original forests. The county is splendidly drained with numerous streams which afford cheap transportation for timber of all kinds, and along the banks of which most of the poplar timber has been cut. For as much as two miles back from the streams the poplar timber has been cut, but oak is never hauled more than a mile, and the timber in the greater portion of the county has been scarcely touched. In the eastern part is some white pine, but the principal woods are poplar, the oaks, chestnut, beech, maple, walnut and other hard woods. There is some magnificent timber in Calhoun. Logs 60 feet long may be seen floating in the Little Kanawha almost any time. Tramways, frequently 10 miles long, are built along

some of the smaller streams and convey the logs to water deep enough to float them. In this county the writer saw a country home, full 60 miles from a railroad, with an interior as handsomely finished in quartered chestnut as could be found in any city home. It was cut, sawed and dressed by the owner of the house who owned a small saw-mill. Some of the lands are owned in large tracts, but those of 1,000 acres or more are the exception, and most of the land in the county is owned in small tracts. The price per acre for timber lands is from $4.00 to $10.00—less than the value of the timber upon it.

AGRICULTURAL.—Had more attention been paid to agriculture and less to timbering, which has pretty well monopolized the people of Calhoun, far better results might be seen upon the farms. The county is well adapted for all kinds of agricultural pursuits. The hills are neither high nor steep, but rather elevated plateaus. The soil is fertile with plenty of limestone, blue grass grows well and the county is particularly suited to sheep and stock raising. Cattle turned out upon the hills find splendid pasture nearly all the year and the rich lands that are not in grass yield abundantly of the grains that are necessary to feed them for the few remaining months. Some sheep are raised and more should be. A crop well suited to the soil of Calhoun and which yields well is tobacco. Very fine tobacco is grown in some parts of the county and it might be made one of the important crops. Excellent advantages are offered here to the agriculturist—rich soil, land lying well, fine grass springing up spontaneously and cheap property, improved lands selling at from $8 to $25 per acre.

CLAY COUNTY.

LOCATION AND CHARACTER.—Clay county lies near the center of the State, slightly to the southwest. Elk river, navigable for push-boats but not for steamboats, flows through the county and empties into the Kanawha, a navigable stream, at Charleston, 50 miles from Clay Court House. Up this stream in canoes or push boats all the Clay county supplies are taken. No railroad penetrates the county, though the Charleston, Clendennin and Sutton railroad has been built, within a few months, from Charleston to the Clay county line, and will eventually pass through the county and extend to Sutton,

50 miles above Clay C. H. The distance from the county-seat to Charleston is 50 miles, to Huntington 100, to Cincinnati 261, to Chicago 566, to Richmond 419 miles. The county is very hilly, the hills high and steep with narrow tops, scarcely wide enough in places for a road along the top of the ridge. The valleys are narrow with scarcely any "bottoms" along the creeks. Seven-eighths of the county is owned by non-residents and held for speculation. This fact, the rugged character of the county and the want of transportation facilities have caused Clay to remain among the most backward counties in the State. It is also the least populous, save one. The county has, however, a wealth of natural resources which will make it when once developed one of the principal ones of the State.

COAL.—The county is remarkably favored with coal, but as yet none has ever been mined save for domestic consumption, and a very small quantity has supplied this demand. In a few places coal veins are now being opened up, with a view to their development upon the completion of the railroad through the county. The entire county is underlaid with coal in veins as high as eleven feet in thickness Soft bituminous, splint and cannel coals are all found and all in large veins. Much of it is the famous Pittsburg vein of excellent coking coal, and the Elk river field will, when once opened up, undoubtedly become as famous for its coke production as the New and Monongahela river fields now are. The Clay county coals are all found above water level and may be easily mined.

IRON.—"In Clay county," said Prof M. F. Maury, "at the mouth of Standing Rock run, 246 feet (barometric measurement) above Elk river, is a fine deposit of nodular brown oxide of iron, the result of decomposition from the carbonate. The nodules are very thickly embedded in a soft, gray clay, and will yield from 35 to 40 per cent of metallic iron, and being soft and cellular work well in the furnace." The thickness of this bed is from 6 to 7 feet and it is known to extend for many miles along the banks of Elk river. This bed of ore was worked along with some from Braxton county at the charcoal cold blast furnace mentioned under "Braxton County," a few pages back. Several other beds of iron ore of various thicknesses have been found in Clay, but little is known of them more than that they exist in paying quantities.

CLAYS, ETC.—There is a good quality of fire clay in this county, but like so much else it has lain unknown or unnoticed for want of facilities for development.

There is limestone and sandstone of very excellent quality for building purposes and an abundance of building sand

TIMBER.—Though Clay is a finely timbered county; no better timber being anywhere found, scarcely an eighth of the timber of the county has been removed. The lands, owned principally in large tracts, are held by persons who have not cared to sell their timber at the low prices that have hitherto prevailed. But with the approach of the railroad lands will go up, better markets will be afforded, and the timber will soon be cut out. Considerable black spruce may be found in the county, some of it very fine. Oaks, poplar, walnut and other hard woods are the principal kinds of timber. A good deal of curly walnut is found, but it is so rare and commands so high a price in the markets that it is quickly bought up and will not last long. Possessing most excellent timber the county is also advantageously situated for getting it out. Between the steep hills are streams in which by means of splash dams timber may be floated from any hillside to the river and there drifted down to market. The Elk river is under the charge of the national government and more or less money is spent every year in clearing the channel of rocks and other obstructions for the benefit of the timber men.

AGRICULTURAL.—With scarcely more than 40 square miles out of the original forest it may readily be seen that little farming has ever been done in Clay. The soil is fertile having a depth of from 4 to 6 inches on the hills and a foot or more in the level lands. The steepness of the hills is all that keeps Clay from being an excellent farming county, and this does not interfere with stock raising. The hillsides are rich and bring good grass. They are excellent for pasturage and stock, and sheep raising would be as profitable here as in any of the surrounding counties. The county is also well adapted for fruit growing.

DODDRIDGE COUNTY.

LOCATION AND CHARACTER.—Doddridge county lies north of the center of the State, about equi-distant between this center and the

southern end of the panhandle. Through the center of the county from east to west the Baltimore and Ohio road extends, by way of which West Union, the county seat, is distant from Parkersburg 55 miles, from Wheeling 150 miles, from Martinsburg 225, from Baltimore 339, from Cincinnati 250, from Chicago 555 miles Rising in the south eastern portion of the county and flowing toward the north west, Middle Island creek divides the county about in halves. The northern half is watered by McElroy creek, the southern by Hughes river. The surface of the county is rolling and hilly, not mountainous nor steep. The valleys are numerous with broad and fertile bottoms along the many creeks. A rich and productive soil covers the entire county, hills and all, making Doddridge one of the best agricultural counties in the State.

COAL.—Through nearly all the county coal is found in the hill sides but in veins not over 3 feet thick. None is mined except for local use and very little for that. The same veins that are worked in Harrison county are found in Doddridge from 80 to 100 feet beneath the earth. They are about 7 and 11 feet thick respectively. Options were recently secured by Eastern parties on several thousand acres of land in the county their intention being to shaft and mine these underground coal veins, but financial difficulty prevented the carrying out of the enterprise.

TIMBER.—Fully half the county is still in timber, a good deal of which has been culled, leaving from a fourth to a third in untouched timber. What has been taken out has gone down the water courses wh ch liberally supply the county with transportation for timber, or has been hauled to the railroad over tramroads which are numerous and of considerable length, one of them being 20 miles in length and over which vast quantities of timber have been hauled. In most places where the timber has been removed it has been all taken, staves, ties, telegraph poles, hoop poles and tan bark all going along with the saw timber and leaving the land cleared and ready for farming. The timber that is left embraces oak, ash, hickory, poplar and a little walnut. Others are numerous but these are the principal kinds. The rich soil, which produces good crops of all kinds, has also produced a good timber crop and the trees are large and fine, making excellent timber and a great deal of it. With good timber and accessibility to market the forests of

Doddridge are very valuable. Wild lands can be bought for from $8 to $10 per acre.

OIL AND GAS.—Little is known of the Doddridge county oil field except by the producers. Oil is found in nearly every part of the county north of the railroad, but little is known of the value of the field save that oil is found, and that, whatever the quantities, there is enough to make the business profitable, the operating companies keeping to themselves all they know. Nearly all of the county is taken up in oil leases, though some tracts are not yet leased. A new field has recently been opened up near the center of the county and one of the wells there produces at the rate of 50 barrels per day. Little is known of the others, but pipe lines and tanks are being constructed, indicating plenty of oil. South of the railroad and near the Harrison county line one of the strongest gas wells known has been bored, and pipes are now laid, piping the gas to Clarksburg to light and heat that town.

AGRICULTURAL. - Of the 160,000 acres in the county about one half is in farms. The entire county is well adapted to farming, well watered, fertile, gently rolling, the hills productive as well as the low lands, with an excellent climate for farming and stock raising. Wheat, corn and the other cereals yield well, and all the products of the farm consumed in the county are raised at home, but not much more. More attention has been given to timbering and oil than to farming, but the latter is now receiving more attention than formerly, and is a growing industry. Farm lands are cheap, selling at from $8 to $20 per acre, and as good a farm as there is in the county can be bought for $15 per acre. The county is particularly adapted to sheep, and a good deal of attention is given them, and indeed all kinds of stock. The county has a limestone soil and produces magnificent blue grass, equalling that grown in any portion of the State Cattle are raised in large numbers and shipped to eastern markets, principally to Baltimore. The excellent grass and the abundance of water make Doddridge a fine stock county. Horses are raised and recently the stock has been much improved. The same is true of sheep, and last summer Doddridge county spring lambs brought in eastern markets a higher price than any others on the market.

FAYETTE COUNTY.

LOCATION AND CHARACTER.--About midway between the center of the State and the southern border is Fayette county, in size the fifth one in the State. It is high and mountainous, the surface badly broken. Taking a general north-western course the New river flows through the county, joining with the Gauley river to form the Great Kanawha which flows some 13 miles within this county. The entire course of these rivers through the county is marked by canyons, precipices and bluffs. They cut deep down below the level of the greater part of the county and wash and tumble over and among the great rocks that fill their beds, between steep walls of rock several hundred feet in height. The grand canyon of the New river which delights the eye of every passenger on the C. & O. R'y is seven or more hundred feet above the bed of the river while back on either side the surface of the county, somewhat broken, but principally rolling table land, is far above the level of the river. In the northern part the county is very high, some of the mountains reaching a considerable height. About three miles below the junction of the New and Gauley rivers are the falls of the Great Kanawha, 14 feet in height. Numerous streams flow into these three rivers in the county, but none are navigable save the Kanawha beginning several miles below the falls. The other streams are rough and rocky and scarcely suitable for floating timber even. Fayette, particularly along the railroad, is thickly settled, its people being principally engaged in mining and coke making. Following the banks of the New river the Chesapeake & Ohio railway passes through the county. Most of the distance it is built on both sides of the river, the banks on either side being too narrow to admit of double tracking. Several short coal roads connect the mines located up the creeks with the C & O. R'y, and recently the Kanawha & Michigan railway has been extended up from Charleston to the mouth of Gauley river where a connection with the C. & O. is made. Fayetteville, the county seat, is four miles from Fayette station on the C. & O., situated on the high land above the river. From Fayetteville to Charleston is 54 miles, to Huntington 104, to Wheeling 282, to Richmond 323, to Cincinnati 265, to Chicago 570.

COAL.—Fayette stands far above all the other counties in the State in coal and coke production. For fifty miles along the C. & O. is almost an unbroken line of coal mines and coke ovens, there being 42 coal mines in operation in the county. In the year ending June 30, 1891, Fayette employed 3,656 men at her 42 mines and 1,158 coke ovens. The coal production was 1,737,617 tons, the coke 326,984. In 1892 the number of employes had grown to 4,301, of coke ovens to 1,334, with 32 more building The coal production was 1,564,579 tons, the coke 680.216. The coal found in the county is all magnificent coking coal, analyses of which may be seen in preceding pages of this work. The coke is higher in fixed carbon and lower in sulphur than most of the other cokes made in America, and is coming into general use. The increase in the coke production of Fayette county in the last year will be seen by the above figures to be over 100 per cent. and still the industry is growing. New railroad lines are projected in all directions, new mines are being opened, and the coal and coke industry in Fayette county has just begun to grow to great proportions. The workable seams of coal within the county are given as follows: Quinnimont, 3 to 6 feet thick; Fire Creek, 3½ to 4½ feet; Nuttallburg, 3½ to 4 feet; Clarion, 5 feet; Lower Kittanning, 7 feet; Upper Kittanning, 5 feet; Lower Freeport, 5 feet; Upper Freeport, 7 feet. In many places several seams are found, one above the other.

IRON.—Good iron ores are found in Fayette, and have been successfully worked. But little attention has ever been given to them because of the greater importance and prevalence of the coal.

FIRE CLAY.—In a county where so much fire brick is used in the construction of coke ovens as in Fayette, deposits of fire clay must be of great value. In Fayette beds are found of varying thicknesses ranging up to eighteen feet. Hitherto it has not been put to use to any great extent, though why it should not be is hard to see. The clay is equal to that found anywhere, and is close to the mines where it is used. It is also on a line of railroad which would offer cheap freight rates for fire and paving brick for which there is always good demand.

TIMBER.—Fayette is filled with the finest timber. Along the rivers and the railroads about all has been cut out, and in the better upland farming regions much has been removed, but still perhaps

one half the county is now in timber. Oak is the principal wood, though many other kinds abound and fill the forests. Timber operations are largely carried on, and several large saw mills are running in the county, cutting up the products of the forests.

AGRICULTURAL.—While parts of the county are rough and rugged the greater portion is well suited to certain kinds of agriculture. The high, rich lands of the greater part of the county are admirably adapted to the raising of tobacco and none raised in the State will excel in quality that which comes from Fayette county. Last year in Lynchburg and Richmond markets Fayette tobacco brought very near the highest price brought by any tobacco raised in the United States. Corn is grown to some extent but tobacco and grass take the place, to a large extent, of the cereals. The land produces excellent grass and pasturage, and sheep and cattle thrive. But not much attention is given to farming, the chief industries of the county being the mining of coal and making of coke.

GILMER COUNTY.

LOCATION AND CHARACTER.—Gilmer lies slightly to the northwest of the centre of the State. The county, like those about it, is not mountainous, but rolling and hilly. Through the centre of the county winds the Little Kanawha river, which is in times of high water navigable as far up as Glenville for steamboats, and at all seasons furnishes means of transportation for logs and light merchandise. The waters of the Little Kanawha are well distributed over the entire county. The soil is clay and loam enriched with limestone and very productive, and no part of it is valueless. Glenville, the county seat, is 96 miles by river from Parkersburg. The closest railroad point is Weston, 28 miles from Glenville, which is by this route 175 miles from Wheeling, 369 from Baltimore, 330 from Cincinnati and 631 from Chicago. Upon the completion of the Charleston, Clendennin and Sutton railroad the distance from Glenville to Charleston by Weston and railroad will be 172 miles. The Ravenswood, Spencer and Glenville railroad is now completed to Spencer and its extension to Glenville is contemplated within the near future. The construction of a railroad up the Little Kanawha valley from Parkersburg to a connection with the West Virginia and Pittsburg railroad is contemplated and will undoubtedly

be built within a short time, giving to all the Little Kanawha counties railroad connection both east and west. The roads of Gilmer county are very good and well kept up.

COAL.—Going up the little Kanawha valley the first coal above the water level is found in the hills near Glenville, where a 5 foot vein, 75 feet above the river, supplies the town. In the western portion of the county coal is found but it is under the ground. The entire county is full of very fine coal, the veins ranging from 2½ to 16 feet in thickness. The 16 foot vein is found in the southern part of county. For want of shipping facilities none of the Gilmer coal has ever been mined save for the local needs of the people of the county, but with a view to inducing railroad construction the coal has been opened and tested and it is found to be equal to the very best West Virginia coking coal. The county is abundantly supplied with the finest of coals and only a railroad is needed to develop it and bring Gilmer up to a high rank among the coal producing counties of the State.

OIL —Recently some oil has been found in the county. A test well at Glenville was put down some months ago and some oil was found, but the company had difficulty in boring and while indications of a good well were found, the boring stopped before oil was reached in any quantities.

TIMBER —Over half the county is still covered with magnificent timber, principally oak. Poplar timber is pretty well removed from Gilmer county, but the very finest kind of oaks remain, all kinds of which abound. Some white pine is found in the western portion of the county, but the principal kinds of timber are the hard woods, linn and poplar. A few saw mills are at work in the county, but the most of the timber is floated down the Little Kanawha to lower markets, transportation being afforded in this way at all seasons of the year. In some portions of the county the timber remains as yet untouched, and offers an inviting field to lumber men. Tanbark is found in abundance.

IRON, CLAY, ETC.—Some iron ore is found in the county, but it has never been developed at all, and the value or extent of it is not known. Limestone is found though not in large quantities. There is a very fine quality of fire clay, which is found in abundance, but it has never been utilized.

AGRICULTURAL.—Stripped of its timber the land in Gilmer is very fine for agricultural purposes. It is in West Virginia's fine blue grass belt and this, the finest of all grasses for stock, springs up spontaneously and forms an excellent sod. The hills are productive to their tops, and excellent hillside pasturage is afforded in every portion of the county. Cattle and sheep are now raised in considerable numbers, but the fact that over half the county is still in forests in which the blue grass grows as soon as the timber is taken off, shows the opportunities still offered to cattle and sheep raisers. The climate is mild and the feeding period short. But not alone for grazing is the county suited. The soil is fertile and very productive, and crops of all kinds yield well. Farming lands will range in value from $5 to $15 per acre, with $10 a fair average. Unimproved lands will average about $3 per acre.

GRANT COUNTY.

LOCATION AND CHARACTER.—The Potomac river which forms the northern boundary of the entire eastern portion of the State, has its source at the corner of Grant and Tucker counties, from which point the State boundary line passes directly north to Pennsylvania. From this point the Potomac runs along the northwestern border of Grant in its course to the sea. Through the center of the county passes the main Alleghany range of mountains, and through the southern portion of the county flows the South Branch of the Potomac river. The entire county is very mountainous, though with fertile valleys between the ranges, many of them broad and all productive. The mountains are all high and most of them steep, though in most places suited for pasturage, and lie in ranges between which the surface is level. These valleys compose a portion of the finest farming lands in the State. The roads between the mountains are very good, those across the mountains rough. Through the entire length of the county, from the Potomac to the South Branch of the same, a railroad has been surveyed and a large subscription has been voted by the county for its construction. Along the Western border the West Virginia Central and Pittsburg railroad has been constructed, giving connections north and south. The most accessible railroad point for Petersburg, the county seat, is Romney, 38 miles away, on a branch, or Keyser, 42 miles away, on

the main line, of the B. & O. By Romney the distance to Martinsburg is 118 miles, to Baltimore 232. By Keyser it is 221 miles to Wheeling, 225 to Parkersburg, 421 to Cincinnati and 689 to Chicago. The completion of the W. Va. C. & P. to a connection with the Chesapeake and Ohio, which is contemplated, would put Grant much closer to Charleston and the southern part of the State.

COAL.—The Pittsburg or Connellsville coking coal covers about one half of Grant county, extending as far east over the county as the eastern front of the Alleghanies. Until recently no coal had ever been mined in this county, but the construction of a railroad through the county gave coal mining an impetus and some mines were opened along the line of the railroad. But while coal abounds in fully half the county, few if any developments have been made save immediately along the railroad. The coal is the fine coking coal which has made Connellsville famous, and is now being worked in several counties in West Virginia. The "Big Vein," 14 feet thick, is found in Grant and worked a little. Other veins are found of varying thickness, but though they are workable, none of them have ever been opened or mined. A railroad through the county, one which would do more than skirt along the edge, would do much toward developing the coal of Grant county.

IRON.—The mountains of Grant county are liberally stored with red and brown hematite and red fossiliferous hematite iron ores. The latter ore is that worked in the prosperous iron regions of Pennsylvania, and at Birmingham, Ala. But there seems to be a thickening of the veins in West Virginia, and while only a few inches in thickness both north and south of West Virginia, it here reaches a considerable thickness. In Grant county five parallel strata or seams of the red fossiliferous hematite ore are found, of the following thicknesses: 8 feet, 18 feet, 13 feet, 11 feet and 7 feet, making a total thickness of 57 feet of valuable iron ore containing from 50 to 60 per cent. pure iron. This ore is richer and in thicker beds than that of Pennsylvania and Alabama; is within a few miles of the finest kinds of coking coals, and among inexhaustible quantities of limestone, and only transportation is wanting to make this one of the great iron producing sections of the country. Above the red fossiliferous ores are vast quantities of brown hematite ores of great value. From these ores iron was made before the war, and

there are now in use a number of stoves which were cast of pig iron made from native ores within the county.

LIMESTONE, CLAY, ETC.--Limestone is found in inexhaustible quantities, and of several different varieties in all parts of the county. A hydraulic limestone is also found, and excellent lime, both common and hydraulic, is made. The lime is of the finest kind, equal to the Berkeley county lime, which is in good demand.

A very fine quality of fire clay is found, but it has never been utilized, and the extent of it is not known.

A soft sandstone, very valuable for building purposes, is found in several places in the mountains of this county. When quarried the stone is very soft and may be sawed or cut into any shape desired, but after exposure to the air it becomes almost as hard as flint. It makes an excellent building stone.

TIMBER.—In over half the county the timber is still standing. A good deal of farm land has been cleared, and since the construction of the railroad in the western part of the county, considerable timber has been taken out, some of the largest lumber plants in the State being along that line, but there are from 150,000 to 200,000 acres of the county still covered with magnificent timber of every kind. The high mountain regions are covered with white and other pines, and black spruce, much of which has been deadened by the pine destroying insect, and most of which is now being cut to save it. The most of the remainder of the timber is white or chestnut oak, though cherry, ash, poplar, beech and maples are abundant. But the distance from market and the difficulty in reaching it have offered little incentive to timber men to cut this timber, except along the railroad where a great deal of timber is now being cut. There is an enormous quantity of tanbark in the county, the oaks being the most abundant timber, with their wealth of tanbark, and there are a few tanneries in the county, one quite large one. Getting out tanbark will long be one of the principal industries of the county.

AGRICULTURAL.—Farming is at present the principal occupation of the people of the county, and some of the most valuable farms in the State are found in the valleys of Grant and the other South Branch counties. The price of farming lands in the county runs up to $50 and $100 per acre, and will average about $25. The soil

in the valleys is like that of Hardy and the other South Branch counties, almost inexhaustible. One man in Grant county has a river bottom farm on which corn has been raised without alternation year after year since the oldest resident of the county can recollect, certainly for 80 or 90 years, perhaps for 100, and the yield is just as good today as it ever was. The soil seems never to wear out and produces magnificent crops. Yields of 100 bushels of corn per acre, or even more, are not rare. All kinds of farming is conducted, but the raising of cattle and corn are the principal industries of the county. The river bottoms are principally used for cultivation, the hills for pasturage. Very fine cattle are grown, principally for the export trade, for which those over 1400 pounds in weight are chiefly used. Large numbers of cattle are raised and shipped annually. Not so much attention is paid to sheep raising as to cattle, though a great many are sold every year. Cleared of its timber this county would afford pasturage and grains for several times as many cattle and sheep as are now grown.

MINERAL WATERS. – There are a great many sulphur and chalybeate springs in this county, some of the waters of which possess very valuable medicinal properties.

GREENBRIER COUNTY.

LOCATION AND CHARACTER. – Greenbrier, next to the largest county in the State, borders on the Virginia line, south of the center of West Virginia. The eastern border is along the top of the main Alleghany range of mountains, and the entire eastern portion of the county is very high and mountainous. In the western portion are also many mountains, while the central portion—about one-half the county—is an elevated plateau, undulating but not hilly, very fertile and productive. East of the center of the county, dividing the plateau region from the mountains, the Greenbrier river flows from north to south through the entire county, turning in the southern portion toward the west, and uniting in the next county on the west with the New river. The Greenbrier river flows almost the entire length of the county through a deep gorge, the mountains on one side, the level plateau far above the river on the other. The central portion of the county is of limestone formation and caverns underlie it, so that streams of water frequently disappear beneath

the earth never, so far as known, to re-appear again At other places great streams of pure spring water gush out of the sides of hills and make excellent power for water mills, many of which are built to utilize this power. In the north and west of the county are Cherry and Meadow rivers, both tributaries of the Gauley, which water well that portion of the county, and afford means of transportation for the timber. Good turnpike roads penetrate nearly every portion of the county and center at the county seat. Through the southern portion of the county, from east to west passes the Chesapeake and Ohio railroad. Lewisburg, the county seat, is 4 miles from this railroad, by way of which the distance to Charleston is 135 miles, to Richmond 242, to Cincinnati 346 and to Chicago 651 miles. Greenbrier is perhaps the most highly favored with natural resources of all the counties in the State.

COAL.—The Flat Top or New River coking coal field, so extensively worked in those districts, and from which the finest coke in the State is made, extends into Greenbrier county from the west, covering about one-third of the county, or some 200,000 acres. Throughout all this section of the county three workable seams of coal are found, besides several smaller ones. The three that may be profitably worked are the Quinnimont seam, about 3 feet 4 inches thick, the Fire Creek seam, just above, 4 feet 2 inches thick, and above this the Sewell or Nuttall seam, ranging in places from 5½ to 7 feet thick. These thicknesses will vary some, but a recent opening which gave them as 3 feet 8 inches, 4 feet 2 inches and 6 feet 11 inches respectively showed about the average thickness. These veins are all above the level of the earth, and are found in the hill sides. No coal has ever been mined in the county, there being no means of getting it to market, and no developments have been made, but throughout all that territory watered by Clear creek, Meadow river, Hominy and Cherry and extending into Fayette and Nicholas counties the coal is known to exist. This is the very best coal for making coke and its proximity to the iron of the county makes it the more valuable. The same veins are all worked on New river, in Fayette county, and successfully coked, New River coke being unsurpassed by any.

IRON.—This county lies in the heart of the richest iron region in the State. Following the Alleghany mountains for almost their

entire length deposits of iron ore are found, and though the ores have never been developed in West Virginia, some investigation of them has been made and something is now known of their value and extent. The iron of Greenbrier is found in the mountains in the eastern portion of the county in great abundance and of fine quality. Brown hematite is the principal ore, and analyses of the ores found in the mountains of Greenbrier and similar ores in counties adjoining, where investigations have been carried further, show that the amount of iron in the ores ranges from 45.92 to 58.83 per cent. The value of the ore is considerably enhanced by reason of the proximity of limestone and coking coal, necessary for making iron from the ores. Placed by direct railroad communication within easy reach of the ore beds there is nothing to prevent this region, which includes the neighboring counties of Pocahontas, Greenbrier and Monroe, from becoming one of the greatest iron producing regions in the United States. Greenbrier is the central one of these three, and has already railroad communication, and the opening of the iron mines will mark a new and prosperous era for the county.

TIMBER.—Every variety of valuable timber found in the State grows in Greenbrier county. And although the county has a merited reputation as an agricultural county and for the extent of its agricultural interests, there are still from one-half to two-thirds of the county covered with the natural forests. In the highest altitudes in the northern portion of the county are found large forests of the black spruce or "yew pine." This black spruce, together with cherry, birch and sugar, grows principally along the waters of Cherry river. In the northeastern part of the county is a very large tract of fine white pine, which has until recently been untouched. The ravages of the pine destroying insect have threatened the destruction of the white pine forests, and as a means of protection a portion of the timber is being cut. There was at one time an abundance of the finest walnut timber, but it was destroyed and wasted, and today fences may be seen in the county built of black walnut rails. Spruce, pine and poplar are the principal soft woods, while the hard woods, which are found both in the eastern and western portions of the county, are principally oaks, cherry, chestnut, maple, birch, hickory, ash and locusts. The Greenbrier, Meadow and Cherry rivers and their tributaries make the timber of the

county accessible to market. The mountains in the eastern portion of the county are covered with magnificent oaks of several varieties, and the value of the tanbark in the oak forests is almost incalculable. With plenty of hides and tanbark in abundance there would seem to be inviting openings for the establishment of tanneries.

MARBLE, STONE, CLAY, ETC.—In the northeastern part of the county among the Beaver Lick mountains a carboniferous limestone or marble is found, very fine grained and soft, susceptible of a high polish and very pretty. It is exactly the same as the famous Tennessee marble, and can be traced along the mountains all the way from Tennessee. In the southwestern portion of the county near the mouth of Muddy creek, in the hills above the Greenbrier river, a ledge of very pretty gray marble has been found, but it has never been developed.

In the western part of the county appears the brown sandstone, which is found on both sides of Greenbrier and New rivers, in Greenbrier, Monroe and Summers counties. This is a beautiful brown stone, and the quarries which have but recently been opened are in constant receipt of more orders than they can conveniently fill. Quite a large area of this sandstone lies in Greenbrier county. Other building stones are abundant, both sand and lime stones. Under the central portion of the county there are some 800 feet of limestone, but this runs out just a little to the west of Greenbrier river, and east of the river some very fine fire and potter's clays are found. Little is known of their extent or indeed of anything more than their existence.

At the mouth of Second creek, in the southwestern corner of the county, gypsum or plaster paris is found, but it has never been utilized.

AGRICULTURE.—Under this heading Greenbrier county would stand close to, if not at, the top of the list of counties in West Virginia. The most magnificent blue grass springs up in every portion of the county as soon as the forests are removed and no part of Kentucky can excel the plateau region of Greenbrier county in the production of fine blue grass sod The luxuriance with which this blue grass grows and the excellent pasturage it affords for almost the entire year have caused this to become a famous stock raising county. Nearly 4,000 head of cattle alone are exported from Green-

brier annually. Many of them go to the eastern markets, though the best market for the larger stock is in Liverpool, and many of them weighing 1400 pounds and over are sent every year direct to Liverpool where they bring a better price than at home. Greenbrier cattle are eagerly sought in the Baltimore and New York markets also. A great many horses are raised and none but good ones. The horses of the county are nearly all of blooded stock and some of them have made records on the race course. The roads are kept in good shape and the horses used a great deal and there is encouragement to breed none but good stock. Sheep raising is a prominent industry in the county and a profitable one. With little attention the sheep flourish and yield a handsome profit. Spring lambs at six months will average about 75 pounds in weight and the average weight of a sheep's wool in the county is about 6 pounds. Cattle and sheep raising are the principal occupations of the people, though other branches of farming receive attention. The soil of the county is fertile and produces well, whatever the crop. Even the lands now in forests are rich and very productive and need only to be cleared to make fine farms. Cereals of all kinds yield well. Wheat and corn are raised and fruits do well, a good deal being produced every year. With pasture unsurpassed, the county is naturally a good one for dairy products, and Greenbrier creamery butter is favorably known in many places. During the summer months a great deal of cream, milk and buttermilk is sent to neighboring summer resorts while in the winter the entire product is made into butter. The county is excellently watered and the grass is green almost the entire year.

MINERAL WATERS.—Greenbrier has as fine limestone springs as can be found in any place. The entire county is supplied with clear, pure, spring water, almost ice cold the year round. Besides these there are numerous sulphur and other mineral springs. Several kinds of sulphur water pour forth from the interior of the earth emitting odors suggestive of the place commonly supposed to occupy the center of the earth, and fashionable pleasure and health resorts are kept at the springs. At one hotel, at least, in the county, the guests are numbered among the thousands every summer. Many of these waters are remarkable in their health giving properties.

HAMPSHIRE COUNTY.

LOCATION AND CHARACTER.--The first county West of the three which compose the eastern "panhandle" is Hampshire. On the north it is separated from Maryland by the Potomac river. The eastern boundary separates the two Virginias. Through the western portion of the county from south to north flows the South Branch of the Potomac river, uniting with the main Potomac river in this county. In the eastern portion of the county, almost parallel to the South Branch, flows the Capon river. The Baltimore and Ohio railroad follows the Potomac river along the northern boundary, while a branch of the same road extends 16 miles from the main line to Romney, the county seat, which thus has direct railroad connection with the world. The distance to Martinsburg by rail is 80 miles, to Baltimore 194, to Wheeling 232, to Parkersburg 236, to Cincinnati 431, and to Chicago 699 miles. Parallel to the B. & O. railroad on the opposite side of the Potomac river, flows the Chesapeake and Ohio canal, affording cheap transportation from Cumberland, Maryland, to Washington, D. C. The county is principally mountainous or hilly, not over a fifth of the county being level land, but what is level, and even the hilly portion is very rich and productive. The valleys between the mountain ranges are broad and parts of them rolling or hilly, the hilly portion being about equal in extent to the mountainous. Hampshire is one of the most favored counties in the State, possessing perhaps a greater variety of resources than any other county, though not in such abundance as some others.

COAL.—Though not claiming much in the way of coal, Hampshire county is not without that valuable commodity. Near the top of one of the highest mountains in the county a 7-foot vein of bituminous coal has been found. The extent of the vein is not large, being over a comparatively small portion of the county. It has been found in but one place as yet, but there is another mountain near by which shows identically the same geological formation and reaches the same or a greater height on which it is supposed the same coal may be found. There are traces also of anthracite coal which is found in the adjoining county of Morgan and in Berkeley, but sufficient explorations have not been made to prove

its existence in Hampshire. A kind of shale is found at about the level of the river which does not burn like coal, but when mixed with coal or wood and kept burning with them, emits a much more intense heat than either one. It is thought that underlying this shale anthracite coal may be found.

IRON —There are vast deposits of brown hematite iron ore of the finest quality throughout Hampshire county, samples of which show upon analysis 51 and 52 per cent. of metallio iron. This ore exists in enormous quantities in the greater part of the county, it being believed that one entire mountain is composed mainly of it. Eighty years ago three charcoal iron furnaces were established in the county and considerable iron was produced, but competition with furnaces on railroads run with cheap coal was too strong for them and they were abandoned, the last of them some ten years since. There are also found fine samples of red hematite, magnetic, manganetic and specular iron ores, but their extent is not known, no one ever having prospected for them very much. The red hematite in particular seems to be very abundant. Samples of these ores are found in various parts of the county and especially near gaps in mountain ranges where the mountains have been broken off and at the ends of ranges which have been broken, indicating that the ores underlie the mountains and if proper efforts were made to discover the deposits of these ores there is little doubt but they would be found in abundance, for traces of them are innumerable. But the people of the county have never thought they had the money to expend in properly searching for these ores, and very little work of this kind has ever been done. The abundance of the evidence, though, makes it almost certain that the ores are to be found in great quantities.

MANGANESE.—The same reasons that have prevented the thorough investigation of the iron ore deposits have prevented the discovery of the full extent of the manganese deposits; but manganese is known to exist in considerable quantities, several veins of it having been already discovered.

PLUMBAGO. Plumbago or graphite is found in several places in veins 2 and 3 inches thick Its discovery has been purely accidental, no search has ever been made for it and its extent is unknown, but it is hardly probable that the veins so far discovered

are all there are, and proper research would undoubtedly reveal more.

OTHER MINERALS.—Besides those already mentioned traces of other minerals are found, such as gold, silver, lead, copper and tin. Specimens of ores have been found in Hampshire county bearing each of these metals, but most of them show but slight traces. Pieces of copper ore are found in a great many places, and the late Prof. Baird, of the Smithsonian Institution at Washington, gave it as his opinion that by going deep under the mountains copper *might* be found. Lead is more abundant, and although the vein has not yet been discovered, great pieces of almost pure galena are frequently found, and it is known that in the early days the settlers ran bullets from native lead, but the location was lost and search has never been made for it.

MARBLE.—Among the limestone formations of the county are found some beautiful black and white marbles. The black is known to be found in abundance; the white is found in smaller quantities, but it is supposed there is more of it hidden away in the earth's recesses, awaiting only the looking for to reward the discoverer and reward him richly.

STONE.—Limestone is found throughout the county, which is valuable for building stone and from which lime is burned. There is also a building sand stone that is found in the mountains. When quarried it is soft and may be easily cut or sawed. Exposed to the air it hardens and becomes as hard and durable as limestone.

GLASS SAND.—Glass sand of remarkable whiteness and purity is found in the mountains along the South Branch valley in large quantities.

CLAYS.—Fire clays are abundant throughout the county in all shades from almost a scarlet to blue and white. A potter's clay is also found which but for a slight discoloration due to the presence of iron, would make porcelain ware.

TIMBER.—About half the county is still well covered with timber. The valleys have been cleared for years but the mountains are all well timbered with oak, hickory, ash and other hard woods, some pine and poplar. The pine has mostly fallen a victim to the ravages of the pine destroying insect. The South Branch and Capon rivers flow through the entire length of the county and afford the means

of timber transportation at all seasons of the year. Chestnut oak is abundant and tanbark is a source of considerable wealth to the county. Several tanneries are located in the county, utilizing most of the bark that is now produced.

AGRICULTURAL.—There are some very fine farms in Hampshire county. The river bottoms are well adapted to agriculture, the hill and mountain lands to grazing. With this combination stock growing is the natural consequence and Hampshire cattle are well and favorably known in cattle markets. The level lands produce good crops, being specially suited for corn, which is used for fattening the cattle which graze the greater portion of the year upon the hills. Blue grass grows luxuriantly and Hampshire shares the reputation of the entire South Branch valley as a most excellent agricultural region. Sheep thrive with little care and are very profitable. Fruit does well upon the high lands and a good deal is produced.

MINERAL SPRINGS.—There are a number of sulphur, iron and chalybeate springs in the county, one sulphur spring in particular being remarkably fine water, equal in all respects to the White Sulphur water of Greenbrier county. The Capon springs have been for many years a favorite resort for persons in search of health.

Less than 20 miles from Romney is a remarkable natural curiosity, the wonderful "Ice Mountain," where ice stored by nature is kept packed away in the loose rock that composes the mountain and may be found all through the hottest summer.

HANCOCK COUNTY.

LOCATION AND CHARACTER.—In the extreme north of the State, the last county in that narrow strip of West Virginia which separates Ohio from Pennsylvania, is Hancock county, the smallest but one in the State. The Ohio river separates it on the north and west from the State of Ohio, and on the east lies Pennsylvania. A branch of the P. C. C. & St. L. railroad extends from the main line in Brooke county to New Cumberland, the county seat of Hancock, a distance of some 10 miles. The county, it will thus be seen, is admirably situated, having communication with the world by both river and rail. The distance by river from New Cumberland to Pittsburg is 60 miles, to Cincinnati 445. By rail the distance to

Pittsburg is 49 miles, to Wheeling 37, to Huntington 252, to Baltitimore 430, to Chicago 528. The county is in the main hilly, the valleys narrow. But hills and valleys are both fertile and none of the land too steep for pasture. The county is well developed, and has several very profitable resources. There is practically no timber in the county, merely enough being left for use on the farms. But other resources fully make up for the want of timber.

COAL.—Three workable veins of good coal underlie the entire county. These veins are high in the eastern part of the county, but dip toward the west until they pass beneath the bed of the Ohio river, being found some 25 feet beneath the water level on the Ohio shore. The coal is a good soft fuel coal, not suited for coking, but burns well. The upper vein is about 4 feet, the second 3½ feet, the lower one about 3 feet in thickness. Immediately below the lowest vein is a ten-foot bed of fire clay, which is extensively mined. When once the clay is taken from beneath the coal the latter is readily mined. The coal is cut along the sides, a wedge is driven in above and the entire thickness of the vein is brought down at once. The cost of mining coal in this way is not over one cent a bushel. The coal is used in the brick kilns and potteries, but the thickness of the vein is not in proportion to the thickness of the clay bed, and not enough is mined for use in the county, and a part of the coal used in Hancock is brought in from Pennsylvania.

FIRE CLAY.—An inexhaustible supply of fire clay, extends over the entire county, and forms the basis for what has grown to be the largest fire and paving brick industry in the United States. For several miles along the river in this county brick, tile and pottery works follow each other in as close proximity as possible. Most excellent clay, cheap fuel and good shipping facilities make the business profitable, and New Cumberland, a flourishing town of nearly 3,000 people, has been built up by this one industry alone. There has been a constant growth in this business, and as the paving of roadways with brick comes more into use the business will increase the more. In 1867 there were 6,800,000 fire brick made in Hancock county. In 1878 there were a million more. In 1892 the estimated production of the county was 70,000,000 brick. These sell for from eight to ten dollars per thousand at the kiln, so that the value to the county of the brick business is now something like

two-thirds of a million dollars a year. Besides the brick business the tile and pottery industry consumes a great deal of clay and is worth a good many thousand dollars a year to the county. Clay products from Hancock county are sent to all parts of the world, the demand is increasing and the supply of clay is practically inexhaustible.

STONE.—Limestone is found in abundance, there are large quantities of sandstone suitable for building purposes, and a flagstone is found in a portion of the county that is very desirable for paving and always finds ready sale in the Pittsburg market.

OIL.—Hancock county was in about the first oil and gas field developed in the country. Gas was found there several years ago in great quantities, and was used in the kilns and potteries at a great saving in fuel, but the flow has ceased. Following the gas development oil was sought in Hancock county and not in vain. The yield was large and though diminished some the field is still productive. The depression in the price of oil has removed the inducements for large production and the quantity of oil produced annually is now smaller than it was some years ago. The present output is estimated at 100,000 barrels a year, on which the farmers receive as royalty something like $5,000, without so much as turning a hand.

AGRICULTURE.—The soil of Hancock county is rich and productive. It is a remarkably fine grazing county, and its fruit interests are perhaps the largest in the State. All the Ohio river counties have a good soil, and this is no exception. Corn, wheat and all kinds of grains do well. Vegetables of all kinds are raised to a considerable extent, the cities in close proximity creating a market for all that is grown.

This county shares the reputation which all the panhandle counties have for sheep raising. Very fine sheep are raised, and the wool is of the best quality bringing, along with that from neighboring counties, the top of the market price. Somewhat discouraged by prices the farmers do not raise so many sheep as a few years ago, but the number is beginning to increase and will eventually be very considerable.

Fruit raising is a very important industry of this county, apples receiving the principal attention. Though there was not over half a crop last year the yield in Hancock county was something like

50,000 barrels, a great many of which were shipped direct to Liverpool, competing in England with the markets of the world, and bringing in return to the county of Hancock about $100,000 for apples alone.

NEW CUMBERLAND, which in 1890 had 2,305 population, an increase in ten years of 89.24 per cent, is the site of most of the brick making plants. Thirteen large clay working plants are in operation in the city. It is an enterprising place with wide, paved streets; well lighted, handsome public buildings and some nice homes.

HARDY COUNTY.

LOCATION AND CHARACTER.—The second county south of the eastern panhandle, and along the Virginia border, is Hardy. It is immediately south of Hampshire county to which it is similar in every respect, the same rivers, the same mountains passing through both in the same direction. The division between the two counties is purely an artificial one. In the western part of the county are the South Branch river and the South Fork of the same. In the eastern part is the Lost river, which disappears under a mountain near the county line, to reappear in Hampshire as Cacapon river, the Indian word for "found again." The county has the same high mountains, the same broad and fertile valleys, the same general character as Hampshire county, the valleys perhaps more fertile. Moorefield, the county seat, is at the confluence of the South Branch and the South Fork rivers, 27 miles above Romney, the closest railrailroad point, by way of which the distance from Moorefield to Martinsburg is 107 miles, to Baltimore 221, to Parkersburg 263, to Wheeling 259, to Cincinnati 458, to Chicago 726 miles.

Up to the present time no coal has ever been found in Hardy, and it is probably one of three counties in the State without coal.

IRON.—The real extent of the iron ores of this county is hardly known, though enough is known to make it certain that the deposits of iron in Hardy county are among the richest in the State. Three veins of red fossiliferous hematite iron ore are found, their thicknesses 8 inches, 1 foot 6 inches and 3 feet 3 inches respectively, containing about 60 per cent. of iron. Above this bed three other beds are found, 25 feet of red hematite, 30 feet of brown hematite, and 14 feet of brown hematite, containing from 45 to 62 per cent.

of iron The thickness of another bed of brown hematite, which was worked years ago, is unknown, having been dug into for 70 feet without finding the bottom. There is every reason to believe that the mountains in every portion of the county are filled with valuable iron ores. Three charcoal furnaces were formerly operated in this county but were abandoned because of competition with furnaces on railroads. Some of the ores found are almost pure iron. A horseshoe made before the war in a Hardy county blacksmith shop, direct from the ore, now hangs in the office of the Secretary of State at Richmond. Several others have been made since.

STONE.—There is an abundance of limestone in every part of the county in close proximity to the iron ores and valuable for use in making pig iron. Lime is also burned from it of as excellent quality as that produced in any portion of the country. The supply of limestone is inexhaustible and extends to every portion of the county. There is good building limestone and sandstone in abundance.

CLAYS. -An excellent quality of fire clay is found in the county in considerable quantities, while pipe and potter's clays are also found. The latter has been worked to some extent and only its unfavorable location prevents its becoming an important industry in the county.

MINERAL WATERS. – Near Moorefield is a very fine white sulphur spring and others are found in various parts of the county, all of which are regarded as equal in value to the white sulphur springs of Greenbrier county, which are so famous and to which they are so very similar. Alum and chalybeate waters are found in many places but none of the springs have ever been used save locally and their properties are unknown beyond the limits of the county.

TIMBER.—The timber of Hardy county, is not, as a rule, fine, though there are some good tracts. About a fourth of the county is in good timber, but nearly three times as much is wooded. The pine has nearly all been killed by the insect which has been so destructive to all the pine forests of the State. The principal timber of the county consists of white, chestnut and other varieties of oak, which are found in great numbers in all the mountain regions of the county. There is also some hickory and walnut. There is very little poplar and the walnut is fast disappearing. As in the

other counties of the South Branch valley, there are enormous quantities of tanbark, which together with the fact that there are a great many cattle raised causes tanneries to flourish. There are several large ones in this county and a good deal of bark is sent out besides. There are vast quantities of timber suited for ties and te'egraph poles standing in the woods.

AGRICULTURAL.—Hardy is chiefly an agricultural county and possesses some magnificent farms. There are three parallel valleys in the county extending north and south—the South Branch, the South Fork and the Lost River valleys. All are very fine with broad bottoms and rich productive soil. This soil has been cultivated in places for over 100 years and is still as good as ever. No fertilizers are needed. The soil is from 12 to 14 feet thick and if it ever gets worn out needs only to be sown in clover for a while to liven it up again and make it as good as ever. Corn is the principal crop of the county and a magnificent corn country it is, too. The average yield is over 50 bushels to the acre and not unfrequently a good field will run up to from 65 to 90 bushels an acre and there is one field the yield from which is said to have actually reached the enormous amount of 166 bushels per acre. Wheat yields well though it is not raised much. The soil is so strong the wheat grows rank, producing too much straw and not enough grain. Hardy is one of the best stock-raising counties in West Virginia. Blue grass grows spontaneously and covers the county with excellent pasturage wherever the trees are cleared away. Stock raising proves profitable and is largely engaged in. Hardy cattle are favorably known in the cattle markets and are shipped in large numbers. Most of them are export cattle, which must be unusually large and fine, and are shipped direct to Liverpool or London. Sheep are not raised in great numbers, the stock men believing cattle more profitable. Some very fine horses are bred in Hardy county and all the horses used in the county for farming or other purposes are well bred and of good stock.

HARRISON COUNTY.

LOCATION AND CHARACTER.—The county of Harrison lies in the northern part of the State about midway between the State of Maryland on the east and that of Ohio on the west. Dividing the county

almost into equal parts the West Fork river, a tributary of the Monongahela, flows toward the north. The river in this county is not navigable, but with its numerous tributaries abundantly waters the country through which it passes. From Clarksburg, the county seat, southward runs the West Virginia and Pittsburg railroad, penetrating the heart of West Virginia and reaching the richest coal and timber lands in the State. A continuation of this line, under the name of the Monongahela River Railroad connects Clarksburg with Fairmont in the next county north and the Parkersburg branch of the Baltimore and Ohio railroad runs through the county east and west. The distance by rail from Clarksburg to Wheeling is 122 miles, to Parkersburg 82, to Martinsburg 202, to Charleston 216, to Baltimore 316, to Cincinnati 277, to Chicago 582. The surface of the county is rolling with low hills, mostly flat on top and all suitable for grazing and cattle raising. In the western part of the county the hills rise to a somewhat greater height than in the rest of the county, but nowhere are they high or rugged. The county is almost all available for farming or grazing purposes. It is one of the oldest counties in the State, and consequently has been more thickly settled and more generally cleared than many of the others. The early building of the B. & O. railroad through the county gave it an impetus that has pushed the county forward in advance of many others. The later construction of the other roads mentioned has added greatly to the prosperity of the county.

COAL.—Harrison county lies in one of the best parts of the great Pittsburg coal field, and for a great many years the development of this coal has been going on. The principal vein in Harrison county averages from nine to ten feet in thickness, and produces an average of about 16,000 tons to the acre. The coal is found above water level and is easily mined It is the finest kind of bituminous coal, suitable for coking, steam and gas. It is shipped to Chicago, Cleveland and the west generally as well as to the east. In the New York markets last year the Harrison county coal commanded 25 cents more on the ton than any other gas coal on the market. Thirty feet above this principal vein is another smaller one, and 70 feet above is still another from two to three feet in thickness, but these are both too small to pay to work, and the only operations in the county so far have been confined to the one vein.

Beneath the surface of the earth, some 480 feet below the Pittsburg vein of coal, is a bed of the Upper Freeport coal from 4 to 5 feet thick. This too is a good coking coal and will doubtless some day be mined and sold. The reports of the State Mine Inspectors show that for the year ending June 30, 1891, the six mines in Harrison county produced 113,268 tons of coal and that 6,214 tons of coke were made in the county. For the year ending June 30, 1892, the production of coal was 142,960 tons and of coke 5,590 tons.

IRON.—Fifty years ago the iron industry in this county was a thriving one. Iron abounds in all parts of the county and at that time it was largely manufactured and products, such as nails and various kinds of hollow ware, were floated down the Monongahela river in great quantities and taken to the present great iron market of Pittsburg. But the industry has died out in this county. The ore is still found in great quantities but not so rich as is found in other places and the facilities for its manufacture and shipment are not so good, so that now there is no iron made in the county.

CLAYS.—Fire and brick clays are found in considerable quantities but their real extent is yet unknown. Excellent ordinary red brick are made, as good as are made anywhere, and are shipped in large quantities, but no tests of the fire clays have ever been made. They exist though, and it is thought that they are widely distributed and of excellent quality. Fine potter's clays are found and these are worked at Shinnston and Bridgeport where crockery and hollow ware are made in considerable quantities. The clay is found with the coal.

STONE.—Limestone abounds throughout the county, and some very fine specimens of it are found. Besides the limestone there is a very fine quality of building sandstone that is found in various places. It is a pretty stone and is a valuable one for building purposes.

OIL AND GAS.—Twelve miles west of Clarksburg in the Dunkard sand a little oil has been found, but it is just being developed and whether it will be found in large quantities or not remains to be seen. The people of Harrison county think there is oil in their county though, and one of them, Prof. Jackson, is preparing to sink a test well ten miles west of Clarksburg, that will be bored clear into the lowest sand with a view to testing fully the county for oil.

The county is in the midst of one of the largest gas fields in the world, and the city of Clarksburg is heated by gas from a well which if not the largest is one of the largest in the world, which pours forth its tremendous volumes of gas with the highest pressure known in any gas well in the country. With an abundance of gas and oil surrounding the county, it is reasonable to suppose that oil will some time be found there.

TIMBER.— Being one of the oldest settled counties in the State, the timber has long since disappeared to give way for the cultivation of the rich soil the county possesses. Much of it has been cut and used upon the farms of the county; much was in the earlier days floated down the West Fork river, and now not over a tenth part of the county is still in timber. What there is, is principally the oaks. There is a good deal of wooded land, covered with trees suitable for rails and other rough timber, but there is practically no saw timber left.

AGRICULTURAL.—Agriculturally the county of Harrison is one of the best in the State. Its soil is a rich limestone soil that produces the finest kind of blue grass sod, and also brings good farm crops. Among the counties of the State Harrison stands first in the production of horses, cattle, milch cows and dairy products. Grazing is the principal occupation of most of the citizens of the county, and the splendid lands, rich, productive and well watered, are made to do their best in the production of fine stock. Immense quantities of cattle and sheep and other animals are shipped every year from this county. It is also especially well adapted to the culture of fruits—apples, pears, grapes and other fruits producing abundantly and of splendid quality. A few mineral springs are found in various parts of the county, red and white sulphur waters being the principal ones found.

CLARKSBURG is seventh of the West Virginia towns in population, having in 1890, 3,008 people, a gain of 30.39 per cent. in ten years. It is a railroad center and commercial town with some manufacturing, and is in the midst of a splendid agricultural country. There are handsome public buildings and homes and much wealth in the town.

JACKSON COUNTY.

LOCATION AND CHARACTER.— Jackson county lies along the western border, immediately west of the center of the State. It includes within its borders the larger part of the great Pomeroy bend in the Ohio river, and just beyond is the State of Ohio. Its river frontage is over 25 miles, while through the county flow Mill creek and Sandy creek, which with their tributaries water the entire county well. Along the bank of the Ohio river runs the Ohio River railroad. The Ravenswood, Spencer & Glenville railroad leaves the Ohio river at Ravenswood, passes through the county eastward and on to Spencer, in Roane county. The Ripley & Mill Creek Valley railroad leaves the Ohio River road at Ripley Landing, and follows up the Mill Creek valley to Ripley, the county seat. Ripley is 12 miles from the river, 56 from Parkersburg, 150 from Wheeling, 89 from Huntington, 250 from Cincinnati and 555 from Chicago. The county is rolling and hilly, with some high plateaus and well watered valleys In the southern part of the county some small mountains appear, but most of the county is not mountainous.

COAL.—There is no surface coal in this county, but plenty may be found deep in the earth. The coal dips low under Jackson county, reappearing above the surface in Mason county and at Pomeroy, but in boring for oil in Jackson county the first coal was found at 120 feet below the surface. This vein is from 7 to 10 feet thick, and is an excellent fuel coal, but not suitable for coking.

IRON.—There are some scattering iron ores in Jackson county, but there is not known to be any valuable deposit of iron in the county. Some years ago a purchase of iron property was made by an iron company in the Mill Creek valley, but it was never developed, the iron probably not being in workable quantities or of sufficient value.

TIMBER —The county was at one time well timbered, but the value of the timber and its accessibility to market have caused the destruction of most of the forests so that now not over a fifth of the county is covered with valuable timber. The poplar is almost gone and the walnut entirely so, but there is still much good oak left. In the southern end of the county, along the waters of Poca river, which flows through Kanawha and Putnam counties into the Ka-

nawha river, there is still a great deal of very fine timber, but the rest of the county is so well watered with streams suitable for floating logs, and so close to places where the timber is exhausted that the best has all gone out. A few years ago the stave business was a tremendous one. In Ravenswood, the principal town of the county, acre after acre was covered with staves a few years ago, and from 50 to 60 wagon loads were brought in daily from the country. Even now there is a good deal done in the stave trade, though not so much as formerly. Railroad ties are one of the principal products of the Jackson timber lands, and many of them are left where saw timber is all taken out.

AGRICULTURAL.—This is pre-eminently an agricultural county, and is an example of the coming condition of many of the counties in the State after their timber is exhausted, and before their minerals are developed. There is some very excellent farming land in the county. Some of the finest farms in the Ohio valley are located in Jackson county, and there is none of the county but what is suited for grazing. Sleek, fat cattle are raised in great numbers, and sheep are very profitable. A portion of the county has a limestone soil and produces an excellent blue grass sod. The land, though not mountainous, is high and dry, and sheep and cattle thrive exceedingly well. The farm lands produce abundant crops of grain, wheat and corn being chiefly raised. The experience of farmers in this county is that sheep are very little care and very profitable. Lands are cheap, pasture good, and with little trouble a nice profit may be made on sheep.

JEFFERSON COUNTY.

LOCATION AND CHARACTER.—Jefferson is the easternmost county in the State, the last one in the eastern panhandle. It lies in the magnificent Valley of Virginia, between the Alleghany mountains on the west and the Blue Ridge on the east, one of the finest agricultural regions in either of the Virginias. Along the northeast border of the county flows the Potomac river. At the base of the Blue Ridge, which forms the southeastern border of the county, flows the Shenandoah in a northeast direction, emptying into the Potomac at Harper's Ferry, where Maryland and the Virginias meet. The main line of the Baltimore and Ohio connecting Baltimore

with Chicago and the west, passes through the county. The Virginia Valley division of the same road, connecting the main line with Staunton and Lexington, also passes through the county. The Valley division of the Norfolk and Western also runs the entire length of the county, north and south, crossing the B. & O. at Charles Town, the county seat. Any part of the county is easily accessible from railroad points. Charles Town is 65 miles by rail from Washington, 105 from Baltimore, 313 from Parkersburg, 309 from Wheeling, 508 from Cincinnati, and 776 from Chicago. By way of the valley Charles Town is 116 miles from Staunton, Va., 252 from Richmond and 349 from Charleston, W. Va. On the Maryland shore of the Potomac river is the Chesapeake and Ohio canal, affording cheap transportation to Washington and the bay. The county was among the earliest settled portion of the State and contains an old established population. The county is rolling throughout its entire extent, save in the southeast where the Blue Ridge mountains rise to a considerable height. Jefferson is one of the three counties of West Virginia in which coal has not been found, but its close proximity to rich coal fields affords plenty of cheap fuel for local use.

TIMBER.—Though the county is almost without timber, with certainly not over one-tenth of the original amount still standing, there is still enough left for all farm purposes, and a little to spare. There are no large tracts, but small pieces are reserved, and what any farmer needs is close at hand. There is besides the oak, hickory and poplar left, a little walnut which has not been taken out, but very little. Some tanbark is gotten out also, but not in great quantities. Timber is cut to a considerable extent to supply several pulp mills which are in operation in Jefferson county. The soft woods that have hitherto been thought valueless are now being utilized by the pulp mills for making wood pulp for paper

IRON.—Iron ores may be found in almost inexhaustible quantities, a single mine having yielded ore for over a hundred years, and still producing liberally. The same deposit is mined today, and many tons are taken out daily to furnaces outside the State. The output is gauged only by the demand and the will of the owner. This ore which is a rich quality of brown hematite, extends over about the entire portion of the county, and has been mined in sev-

eral places, always making good iron. It contains from 50 to 60 per cent. of metallic iron. The cellular, honey-combed and pipe varieties of the brown hematite are found. There have been furnaces in Jefferson county, but the ores now mined are taken outside the county.

LIMESTONE. This may be found in every portion of the county except the small part east of the Shenandoah river, which is of sandstone and slate formation. Lime of excellent quality is made at numerous places in the county from the abundant stone, and commands a good price in the markets.

A hydraulic limestone is also found in portions of the county, from which a superior quality of cement is made. These cement works have been in operation for some time, and Jefferson county cement is well known to the trade.

A very handsome limestone for building purposes is abundant, and is in great demand in the city of Washington. All the stone for the building of the British Legation and other handsome structures in the national capital, was quarried in Jefferson county and taken down the canal on flat boats. This stone is very plentiful throughout the county.

MARBLE.—Some of the limestone approaches and even becomes marble, and in several places in the county a beautiful marble is found of good color and taking a high polish, but no development of these deposits has ever been made.

AGRICULTURAL.—It is principally as an agricultural county that Jefferson is known. Lying as it does in the best part of the Valley of Virginia, its soil is remarkably productive. It was settled among the first of all the counties now comprised in West Virginia, and its value as farming property has been known ever since, so that almost the entire county has been long since devoted to farming. Little of the county is rough, and most of it is beautiful, level or rolling, rich farming land. The average yield of wheat through the county is from 20 to 23 bushels to the acre, of corn 50 bushels. The soil is a limestone one, and brings magnificent blue grass. Cattle are raised and many sold every year, principally to the export trade. Some sheep are also raised, but not so many as might be. The proximity to market, added to the productiveness of the soil, makes Jefferson doubly valuable as a farming county. Farm products of

all kinds may be put into the markets of Washington and Baltimore in a few hours from almost any part of the county. Fruit culture offers vast possibilities in this county, though not so much attention is paid to fruit as could be done profitably. The most magnificent peaches are grown in the county, as most persons who have passed through the county by rail have discovered, for boys with baskets board every train, with this luscious fruit for sale. Creameries and canning works would undoubtedly prove profitable in Jefferson county.

CHARLES TOWN, the business and banking point for a large and prosperous agricultural community, had in 1890 a population of 2,287, a gain of 13.44 per cent. in ten years. There is some manufacturing done in the town but it is principally as the center of the rich farming country that it has attained its present position. It has a delightful climate and many prominent people live there.

KANAWHA COUNTY.

LOCATION AND CHARACTER.—Kanawha, the third county in the State in size, the first in population, lies on both sides of the Great Kanawha and Elk rivers, southwest of the center of the State. Its surface is varied, mountainous in the east and south, hilly in the other parts with broad bottom lands along the Kanawha valley. There are a good many smaller water courses in the county and all have fertile level lands in their valleys. Much of the county, though neither rough nor broken, is high, but there are few mountains in the county unfit for cultivation. The Great Kanawha river flows for nearly 50 miles through the county, navigable all the way, by means of which cheap transportation is given the enormous quantities of coal and timber that go annually out of the county. The Elk river, which empties into the Kanawha at Charleston, flows for some 20 miles through the county before it reaches the Kanawha, and is navigable in favorable seasons for small steamboats to the county line. Coal river, Pocataligo river and other smaller streams are large enough to bring out a great deal of timber whenever there is a rise. What these rivers are to the county may be seen from the report of A. M. Scott, Resident U. S. Engineer at Charleston, in charge of the rivers. His report for 1892 shows the tonnage of the Great Kanawha river as recorded at Lock Six, four miles from

Charleston, for the year ending June 30, 1892, to be as follows: Coal, 26,787,788 bushels or 1,071,511 tons; timber, 39,585,000 feet B. M. or 65,975 tons; tanbark 590 cords, 590 tons; railroad ties 924,650 or 138,697 tons; hoop-poles 980,000 or 2,450 tons; shingles 2,750,000 or 4,125 tons; brick 150,000 or 337 tons; merchandise and produce by steamboat 74,800 tons; total tonnage 1,360,750. The report also shows that 44,400,000 feet (B. M.) of logs and lumber, 380,000 railroad ties, 1,405,000 oak staves and 240 cords of oak tanbark came out of Elk river in the year ending June 30, 1892, a total of 139,800 tons. From the report we quote: "The 44,400,000 feet of lumber is divided in kind about as follows: Poplar 33,000,000; white oak 8,000,000; hemlock 1,500,000; the rest being mainly walnut and ash. The amount of general merchandise and produce carried on the river is estimated at 10,000 tons, making the total for the year with the timber product as above 149,800 tons."

In addition to the river transportation the county is well supplied with railroads. For its entire length through the county the Kanawha river has a railroad on either side, the Chesapeake and Ohio on the south connecting Cincinnati with Richmond and Washington, the Kanawha and Michigan on the north, connecting the C. & O. in Fayette county with Toledo and Columbus, Ohio By way of these railroads Charleston, the county seat, is 50 miles from Huntington, 228 from Wheeling, 387 from Washington, 369 from Richmond, 191 from Columbus, 310 from Toledo, 212 from Cincinnati and 517 from Chicago. By river Charleston is 261 miles from Cincinnati. The Charleston, Clendennin & Sutton railroad, designed to be a connecting north and south line through the center of the State, is already completed 20 miles up Elk river, and is soon to be extended. Several short line roads in the southern part of the county connect large coal mines with the C. & O. R'y. The most populous and one of the largest, Kanawha is also one of the richest and most varied in its natural resources of any of the counties in the State.

COAL.—All the soft coals found in the State are found in Kanawha county. The splint, steam, gas, fuel, coking, cannel and semi-cannel are all found in the county and there is no part of the county in which coal is not found. Along the Chesapeake & Ohio railroad and the river it is extensively mined, but elsewhere little has

been dug. In the eastern and southwestern portions of the county cannel coal is found and has been mined at Cannelton, on Mill Creek of Elk river and a ong Big Coal river. North of Charleston and along Elk river some little coal is mined for local use and splendid coal it is. The reports of the State Mine Inspector show that in the year ending June 30, 1891, there were 48 mines in the county, employing 2,710 men and producing 1,209,386 tons of coal, and 12 coke ovens producing 5,637 tons of coke. For the year ending June 30, 1892, the production of coal was 1,175,371 tons and of coke 2,311 tons. The completion of the railroad up Elk river from Charleston, and of the Kanawha & Michigan railroad up the Kanawha from Charleston will open up a large number of new mines and materially increase the output of Kanawha coal.

IRON.—Scattered through nearly every part of the county are iron ores of greater or less value. In the southern part of the county a few years ago, a black band iron ore was found in considerable quantities, and an iron furnace was operated at Spring Hill, six miles west of Charleston, in which this ore was used, but deposits of black band are variable, and the ore in this one soon became too thin to be profitably worked. Veins of ore from fifteen inches to a few feet in thickness have been found throughout the county, both hematites and gray carbonates. In the hills at Charleston is a small seam which was opened up some years ago, and in 1872 the erection of a furnace to use this ore was begun, but financial difficulties prevented the completion of the furnace and no iron was ever made.

SALT.—Five miles from Charleston, on the Kanawha river, the first salt ever made by white people west of the Alleghanies was made, and since that time hundreds of thousands of barrels of it have been made and sent to market. At one time there was scarcely a distance of a mile along the river for 20 miles where there were not one or more salt furnaces in operation. The brine is found at a depth of 1,000 feet or more, is pumped into vats and evaporated, leaving the crystallized product. The Kanawha salt is especially in demand by pork packers, possessing peculiar qualities necessary for that use. At present a single furnace is in operation in the county, making salt with natural gas for fuel. Bromine is also made from the salt, and other chemicals might be. Soda-ash, so largely used

throughout the country, and all imported, might be as cheaply made here as anywhere, and ought to be.

MINERAL WATERS.—Besides the salt water other mineral waters are found. Sulphur, alum, chalybeate and lithia waters are found in the county, all possessing more or less medicinal virtue. They are only used locally.

OIL AND GAS.—In the days when George Washington was carrying the chain and compass across the Alleghany mountains, before the war of the revolution, natural gas had been discovered in what is now Kanawha county, and since that time it has been put to practical use in the making of salt. There is undoubtedly much of it though all the wells as yet bored for it have brought but a small flow of gas. Proper search will doubtless reveal large quantities of gas, and yet, with coal so close and cheap, gas is not needed by our people. Oil has been bored for and in portions of the county has been found in small quantities, but no investigations have yet proved its existence in paying quantities, though there is every indication that the great oil belt of Pennsylvania which has been followed into West Virginia, extends on through the southern part of the State, and through this county.

CLAYS.—Excellent brick clays are found in abundance in the county, and millions of brick have been made. The clay makes a beautiful smooth red brick, very desirable for building purposes, and so hard that several miles of Charleston streets have been paved with them. Fire clays are also found in large deposits, but none have yet been worked. The demand for fire brick, sewer pipe, etc., will doubtless cause the development of fire clay before long.

STONE.—No finer building stone is found anywhere than that which fills the hills of Kanawha county. A hard, clean, lasting sandstone, it is of great value for building and extensively used. The capitol, court house, several churches and building blocks in Charleston show to good advantage the beauty of the stone. It is particularly adapted for use under water, resisting the action of the waves for years, and for this purpose it has been extensively used. The government locks of the Kanawha river have all been built of it, and bridge piers in the Ohio river have been constructed of stone from quarries in Kanawha county.

GLASS SAND.—Though none has ever been used here the glass

sand of Kanawha has been tested, and found to be well suited for making glass. There is much of it awaiting development.

TIMBER.—Though Kanawha has been cleared and settled until it now contains more people than any other county in the State, there is perhaps a half the county still in the original forest. The valleys of the rivers and the streams have all been cleared, but back from the water courses where timber would have to be hauled several miles little or none has ever been cut. Statistics given above give some idea of the size of the timber business in the county. Some of the timber mentioned is cut in other counties, but Coal and Pocataligo rivers both bring down great quantities of timber, neither of which figure in the statistics given. The saw mills of Charleston also cut enormous quantities of timber that is not included in the figures given. Oak, poplar, chestnut, hickory and some walnut are the principal woods left in the county.

AGRICULTURAL.—The Kanawha valley farms equal in fertility of soil and productiveness the broad bottoms of the Ohio river, and form the principal part of the county that is farmed. Corn, wheat, oats, tobacco and garden crops are principally raised. The hill lands grow good grass and make splendid pasture, but cattle are not extensively raised. In some parts of the county tobacco is the principal crop, and just as good tobacco is grown as in the neighboring counties where it forms the chief crop. Fruits are largely grown and are productive. Most luscious peaches grow in portions of the county, while apples, pears and grapes, and all kinds of small fruits yield abundantly. The raising of crops for the towns of the valley and the miners, who depend principally on the stores for their garden products, is an important branch of the farming industry.

CHARLESTON, the capital of the State, is a flourishing commercial city, the banking and business center for all the mining country in the New and Kanawha river valleys. Its population was given in 1890 as 6,742, an increase of 60.83 per cent in ten years. Elk City, immediately adjoining, but under separate city government, with the growth since 1890, give the place at least 10,000 people now. The city has some 20 wholesale houses which supply the entire southern end of the State with goods, five banks all doing a splendid business, wood working and other factories employing over a

thousand men, has paved streets, electric light and gas, water works, good sewerage, electric street railway, bridges across both rivers, handsome city, county, State and United States buildings, and is a rapidly growing prosperous city.

LEWIS COUNTY.

LOCATION AND CHARACTER.—Lewis is situated near the center of the State, a little to the north of it. It is in the high, hilly part of the State, west of the mountainous portion, and is rather rolling than rough. In a few places the hills rise to a considerable height, but are nowhere mountainous or broken. Rising in the southern part of the county and flowing northward through the center is the West Fork of the Monongahela river. In this county it is not navigable for vessels of any kind, but waters the country well, its tributaries reaching every section of the county. North and south through the county runs the West Virginia and Pittsburg railroad, connecting the center of the State with the Baltimore and Ohio railroad. From Weston a branch of the same road runs into Upshur county, opening another almost entirely undeveloped country. Lewis is one of the older counties of the State and has been pretty thickly settled. Good roads connect all parts of the county and there are several small towns throughout the county. From Weston the county seat, the distance to Parkersburg is 107 miles, to Martinsburg 227, to Charleston 240, to Wheeling 147, to Baltimore 341, to Cincinnati 302 and to Chicago 614.

COAL.—Throughout the county veins of valuable coal are found, from 5 to 6 feet in thickness, and in places the veins reach as much as 14 feet. The coal belongs to the Pittsburg bed and having been tested is found to be valuable coking coal. For local use the coal has been mined, but not for any other purpose. None has ever been shipped although it might easily be mined, and the quality is as good as any to be found in the State, and it is believed that the new railroads recently constructed in the county will tend to develope it.

GAS.—Natural gas has been found in several places in the county and there is reason to believe that oil may be found also when properly sought for.

CLAYS.—There is an abundance of valuable clay in the county,

the ordinary brick clay, fire clay, and potter's clay all being found in large quantities. From these clays considerable brick, tiling, sewer pipe, etc., is made and there is enough of the material in the county to warrant a large increase of the business.

Near Weston there is a deposit of fine yellow ochre, about 3 feet thick, of a rich orange color, which when burned yields a pure, rich red. It is very valuable as a mineral paint.

STONE.—There is a good deal of limestone in the county, though it is principally in thin veins. There is also a good yellow sand stone, though neither is as wide spread as the blue sand stone that is found in nearly every part of the county. The latter is a fine building stone, hard and durable and from it is built the large hospital for the insane at Weston. It is a bluish gray in color, retains its color well and is free from sulphur and iron.

A good quality of glass sand is also found in the county, but is not in general use.

TIMBER.—The county was settled about the first of the present century and was formed into a county in 1816, and since then the valuable timber has practically all disappeared. There are still a good many small tracts that are kept in timber to supply the wants of the farmers, and a few tracts of timbered land. Possibly half the county is still wooded but of this part a good deal of the best timber has been taken off. Still there are large areas of fine white and chestnut oak and other hard woods.

AGRICULTURAL —Lewis is essentially a grazing county. Of the counties in West Virginia Harrison probably stands first in the production of cattle and as a grazing county, with Lewis second. The county is principally rolling with low and gently sloping hills on which blue grass grows naturally to the very tops. The lands when cleared of their timber produce naturally a luxurious growth of fine blue grass and the county has come to be a great grazing one. Cattle are grown in great quantities and of the very finest kind, sheep are raised in larger numbers than formerly and horses are also raised. Some of the finest blooded horses to be found in the State are raised on the Lewis county stock farms. The soil of the county is all rich and productive and some other crops are raised besides grass. Wheat and corn yield well, tobacco is raised to a limited extent and fine fruits are raised. Apples and grapes do particularly well.

LINCOLN COUNTY.

LOCATION AND CHARACTER.—Lincoln county lies slightly to the east of the most western point in the State. It is almost equally distant from the Ohio, Kanawha and Big Sandy rivers. In the south-western part of the county are the Guyandotte mountains, the only ones within its borders, though the entire county is rough and hilly. Through the southern and western parts of the county flows the Guyandotte river, navigable for push-boats through the entire length of the county and into Logan. The waters of Mud river, a tributary of the Guyandotte, water the central portion of the county, while for a short distance in the north-eastern part of the county flows the Little Coal river, uniting with Big Coal to form the north-eastern boundary between Lincoln and Kanawha. The prospective railroads up the Guyandotte and Mud rivers have not yet been commenced, but will undoubtedly some day be built. At present the nearest railroad is the Chesapeake and Ohio, from which Hamlin, the county seat, is distant 18 miles over a good road, and some parts of the county are much closer. This puts Hamlin but 36 miles from Huntington, 50 from Charleston, 251 from Wheeling, 419 from Richmond, 197 from Cincinnati, and 502 from Chicago, all by rail save 18 miles.

COAL.—Lincoln is underlaid with magnificent coal deposits, which only await transportation to be developed. The magnificent deposits of coals found in Boone and Logan counties, which are in the richest region in the State, extend into Lincoln, which contains a portion of what Prof. White, of the West Virginia University, terms "one of the largest areas of pure cannel coal known in any country of the world." Lincoln coals are similar in character and thickness to the coals of Boone and Logan, but the area of the thickest veins is not so large in Lincoln as in some of the neighboring counties. There is coal in every part of the county, but in the northern part the veins are smaller, being not much over three feet in thickness, while in the southern part of the county rich deposits of the very finest coal are found in abundance. One vein of coal in the southern portion of the county has a thickness of 11 feet. Cannel, splint and bituminous coals are all found in Lincoln county.

TIMBER.—Considerable poplar timber has been cut out of Lincoln

county for the last twenty years, and all the walnut there ever was, but there still remain magnificent tracts of tens of thousands of acres of timber which have never been touched by the woodman's axe. Fully one-half the county is yet covered with magnificent oak forests, and the greater portion of this with poplar also. There is also much ash and beech, some chestnut, a little pine, and some other timber, all of which may be easily gotten to market by means of the Guyandotte, Coal and Mud rivers and their tributaries. Little timber has ever been sawed at home, it being cheaper to float the logs out and saw them closer to market. Even staves are taken out in this way, not being sawed or split till they have reached a railroad point. The northern part of the county has been cleared and settled to a greater extent than the southern, where the greater part of the timber that is still standing is to be found.

AGRICULTURAL.—The eastern portion of the county is a famous tobacco region. Some of the finest tobacco in the country is raised in Lincoln county, and commands as high prices as that grown anywhere in the United States. Heavy burleys are raised all over the county, but the fine light colored leaf is grown principally in the eastern portion and has an excellent reputation in the tobacco markets of Richmond. The rich lands of the county, as soon as the timber is taken off, prove to be excellent soil for the culture of tobacco. It is raised principally by Old Virginia farmers who know how. The soil of Lincoln is all fertile and yields good grain crops when cultivated, but aside from the tobacco culture little farming is done. Some corn is grown, but not more than is consumed in the county. Grass grows well, and the county is well covered with good grass sod. Cattle are raised to a considerable extent and do well. Some attention is paid to sheep raising, and they too thrive and prove profitable. The county is well adapted for stock growing and fruit culture, though little fruit is now to be found in the county.

LOGAN COUNTY.

LOCATION AND CHARACTER.—Logan is one of the border counties of the State, lying along the southwestern boundary, adjoining the State of Kentucky, and at its southern corner, touching the corner of the State of Virginia The Tug Fork of Big Sandy river, the

western bank of which forms the dividing line between the States of West Virginia and Kentucky, follows along the edge of Logan county. This river is navigable in favorable seasons for steamboats, which have at times come well up into Logan county, and is at all times navigable for push boats. Flowing almost due north through the entire county, is the Guyandotte river, which is also navigable for push-boats and was at one time locked and dammed about half way from the mouth to Logan Court House. But the war broke up the company which owned the dams and they were cut out to make a channel for the logs which are taken out. Until the construction of the railroad in the last few months most of the merchandise used in Logan county was taken there in push boats up the Guyandotte river, some 80 miles from the mouth, or were hauled in wagons from the railroad near Charleston, some 55 miles. The Norfolk & Western railroad has recently been completed through the county, following closely along the southern border, and this road will have a wonderful effect in developing the resources of the county. Logan Court House is 65 miles from Charleston, all but 10 miles of which is over country roads, is 12 miles from the Norfolk & Western, by way of which it is 93 miles from Huntington, 515 from Norfolk, 238 from Cincinnati and 543 from Chicago. Most of the county is mountainous or hilly, the valleys not attaining any considerable width, but hills and valleys are alike fertile and productive. The waters of the Guyandotte and Big Sandy rivers water well the county and afford means of getting out timber. The Guyandotte valley and some of the smaller ones are very rich in natural resources and have been pretty thickly settled, but the greater part of the county has been held in large tracts for speculative purposes and has never been developed to any extent. The construction of the railroad, however, has had a remarkable effect on the value of lands, those which might a few years ago have been bought for 50 cents an acre now commanding an average of about $10 an acre, and even at that most of them are cheap.

COAL.—Every known kind of coal except anthracite is found in Logan county and there is not a portion of the county that is not well supplied with it. Developments in many p'aces show about ten veins of coal over 2 feet in thickness, and it is thought this

number will be found over the greater portion of the county, the same being found in Boone county. Besides this enormous amount of coal which may be found in the hill sides, the New River veins are supposed to underlie the entire county, though no investigations have ever been made below the surface of the earth. The veins so far discovered range from 2 to 13 feet in thickness and are piled one above the other to almost incredible heights. Between the Guyandotte and Big Sandy rivers one mountain has been developed and the ten veins of coal from top to bottom, all over 2 feet in thickness, aggregated 52 feet of coal. Another mountain but partly developed shows two veins of 4 feet, one of 5 and one of 7 feet. Investigations were carried no further. But even if there were no more coal in the mountain, which there probably is, there are known to be 20 feet of good coal in four workable veins. One coal vein is 13 feet thick with two partings which aggregate about a foot, leaving 12 feet of solid coal. In this vein there are three different kinds of coal separated by the partings—a fine burning, soft bituminous coal, splint and peacock coal. Some of the finest cannel coal known is found in the region of which Logan county is a part, and this is said to be the largest field of pure cannel known in the world. In Logan cannel coal is found in veins as large as 4 feet thick. Almost anywhere a pick is struck into the earth coal may be found. Many of the streams flow over beds of solid coal, from the tops of which the earth has been washed away, and coal may be dug right out of the bed of the creeks. In other places where the base of a mountain has been cut slightly into, to make room for a road, the coal crops out, and it is no uncommon thing in Logan county to drive along a road that is walled in on one side with several feet of coal, while the stream on the other side flows over a broad bed of the same material. Every family in the county may have its own coal bank and many of them do. And yet, with all this abundance of coal on every hand, not a bushel has ever been mined for market. There have been no means of reaching a market with it. The coal still lies where it has lain for countless ages, scarce hidden from the eyes of man, and waits the time when human enterprise shall penetrate the forest fastness and reap a rich reward from treasures buried there.

TIMBER.—But coal is by no means Logan's only wealth. While

all or nearly all the county is covered with coal, three fourths of it is also covered with untouched timber. Magnificent forests of oak, poplar, ash, lynn, maples, beech, birch, pines, hickory and other varieties still cover the greater part of the county in their primitive state. For thirty years timber men have been at work, destroying the forests and still in all this time not over a fourth of the timber has been removed. The rest still stands, exceeding in value, in most cases, the price at which the land on which it grows is held. Some of the finest timber in the State is found in Logan county. The soil is rich and strong and has produced tremendous growths among the forest trees. One poplar tree in Logan county measures 30 feet in circumference at the base, while others are said to be as large and many are found from 7 to 8 feet in diameter. All the other varieties of timber grow to proportionate size. The oaks in particular reach prodigious sizes. No county in the State is more favorably situated for getting out the timber than is Logan. The Guyandotte and Big Sandy rivers afford cheap and easy means of floating timber to markets or shipping points, while their tributary streams, which are quite numerous, may be utilized in times of rain for floating the logs to the rivers. Splash dams are used a good deal to get logs out of the smaller streams. As an estimate of the value of the timber still standing in Logan county, three million dollars will not be far amiss. And like the coal, this awaits the man who will take it out to make him rich.

IRON—Iron ores are found in most of the county, though the extent and value of them are unknown. No one has ever had the iron interests of the county looked into, and its possibilities in this respect are unknown. As Logan is but a continuation of Wayne county and in all respects so similar to it, it is not at all improbable that all the ores which are found in Wayne county may also be discovered in Logan. But this is speculative. That there is some iron ore in the county is certain.

LEAD—A little lead is found in small quantities in some portions of the county and in the olden time the pioneers used to run their own bullets out of native lead. But whether there is any lead of commercial value in the county is not known.

OIL AND GAS—While no oil has ever been found in the county, there are indications which encourage the people to hope that some

day it may be found. In Kentucky, not far from the county line, oil has been found. Near the line, recently, on the Logan side, a test well was put down. While no oil was reached there was a tremendous flow of natural gas, which usually goes hand in hand with oil. All over the county natural gas bubbles up through the surface of the earth and it is thought by many that underlying the vast coal field of this and adjoining counties is a great sea of oil.

CLAY, ETC.—An excellent quality of fire clay is found and is supposed to exist in great abundance. Building stone is plentiful. In connection with the coal a good roofing slate is found. But none of these materials which will some day manifest their value, have as yet been more than found to exist.

AGRICULTURAL—The hills of Logan have principally a black, gravelly soil, that is very fertile. But as a rule they are most too steep for cultivation. The valleys are well tilled. The hills where not too steep are excellent land for corn, which yields in the county from 40 to 60 bushels an acre. Other grains are not raised much. The old Virginia settlers raise very fine tobacco. The new rich soil is just what it requires and they know all about its culture. This is an excellent cattle county and especially adapted to sheep. The latter do well, seldom suffer from disease on the wide range they have and for their wool as much is paid in eastern markets as for that from any section of the country. In this, as in many other counties, sheep raising will follow up the clearing of the hills and will some day become one of the principal industries of the State.

MARION COUNTY.

LOCATION AND CHARACTER—In the northern part of the State, separated by a single county from Pennsylvania on the north, from Maryland on the east and from Ohio on the west, is Marion county. The Tygart's Valley and the West Fork rivers both flow into the county, uniting near Fairmont to form the Monongahela river. Following the Valley river from Grafton down to Fairmont is the main line of the Baltimore & Ohio railroad which connects Chicago by way of Wheeling and West Virginia with Baltimore and the east. From Clarksburg down the West Fork river to Fairmont runs the Monongahela River railroad, while from Fairmont on down the Mo-

nongahela river to Morgantown runs the Fairmont, Morgantown nd Pittsburg branch of the B. & O. road, the intention being to extend the road on down to Pittsburg. Fairmont, the county seat is 78 miles from Wheeling, 126 from Parkersburg, 202 from Martinsburg, 316 from Baltimore, 260 from Charleston, 321 from Cincinnati, and 545 from Chicago. The county is high and rolling or hilly, with no mountains and few steep hills, and besides possessing valuable mineral resources is nearly all excellently adapted to agriculture. The county is in the older portion of the State, is thickly settled, prosperous and growing.

COAL—The county is abundantly supplied with splendid coal in veins from 18 inches to 10 feet in thickness. The splendid Pittsburg vein of coking coal underlies the county throughout its entire area and along the railroads is largely mined and coked. Indeed, Marion has become the center of the coal and coke industry of the northern part of the State and is far ahead of any other county in that part of the State in coal and coke production. The reports of the mine inspectors show that in the year ending June 30, 1891, the coal production was 245,899 tons, the coke 52,852 tons. For the year ending June 30, 1892, the coal production was 904,896 tons, the coke 227,291. The coal is good and finds a ready market while the coke sells easily in competition with the coke of Connellsville and other Pennsylvania districts. The excellence and prevalence of the coal, the splendid shipping facilities and the easy access to markets make the coals of Marion county assume a great importance. While recently the business has rapidly increased, it really has but just begun to grow, and the immense coal fields of the county will some day be the basis of an industry that will give employment to many times the number of men at present engaged in digging coal or making coke.

OIL—In Marion county is one of the largest oil fields in the State —the Mannington field. Pushing south from Pennsylvania the oil was followed into Monongalia county and thence down through the western end of Marion where a splendid field was found. At the time of its discovery it was the best field in the State and though it has been partly drained the flow of oil continues to be large and the fortunes already made by those who were fortunately situated in the right part of the county are still increasing. The wells are

all good producers, a single well when first opened yielding at the rate of 700 barrels of oil a day. This flow, of course, diminished, but the yield of the field is large. Gas is found in abundance and used for lighting and for fuel.

CLAY—For many years most excellent fire clay has been worked in Marion county. Fire and furnace brick, sewer pipe, tile, etc., are made from it and the clay is valued highly. The brick has been used in Fairmont for street paving, as well as for other purposes and sustains its reputation well. There are almost inexhaustible quantities of clay in the county and the growing demand for products of fire clay will cause its further development and build up the industry in the county.

STONE.—Building stone, both lime and sand, is found in the county in abundance. Glass sand is also found and worked at Fairmont in the manufacture of glass bottles. It is a clear white sand and makes a splendid article of glass.

TIMBER.—The county is perhaps a third covered with timber. Much of it has been cut both for commercial use and to make room for farming, yet there is much remaining. Oaks, poplar, chestnut, maple and hickory are the most abundant though other timbers usually found in the forests of this latitude and altitude are found. The numerous streams and railroads which pass through the county offer cheap and easy means of getting timber out and several saw mills are in operation in the county. Staves and poles and railroad ties and all the other products of the forests are also taken out. The coal and oil operations in the county have afforded a home market for much timber in addition to what is sent away.

AGRICULTURAL.—Possessing principally a limestone soil, rich, deep and productive, the county is an excellent one for agriculture. Corn, wheat and other grains grow well, both on the hills and in the valleys, and in the higher parts buckwheat is raised to some extent. Blue grass grows in all parts of the county and grazing is a principal feature of the work upon the farms. Dairying and stock raising are carried on largely and many cattle are annually shipped from Marion county. For fruits the county is well suited and many kinds are raised, all yielding well.

FAIRMONT is a manufacturing and commercial city, the banking and business center of the entire coal and coking region of the

county. It had by the census of 1890 a population of 1,023 which has largely increased since. It is now a growing flourishing business place of about 3,000 people, upon which a large territory of surrounding country is dependent. Several manufacturing plants are located at Fairmont, many public improvements have recently been made and it is one of the most prosperous of the smaller cities of the State.

MARSHALL COUNTY.

LOCATION AND CHARACTER.— Of the four counties comprising the northern "panhandle" Marshall is the most southern. On the east is Pennsylvania, on the west Ohio. Following along the western border the entire length of the county is the Ohio river, which affords the cheapest transportation, and whose valleys are always fertile. The Ohio River railroad follows the Ohio river along the western border of the county, connecting all the east and west railroads that pass through the State, while the Baltimore & Ohio railroad parallels it about half the length of the county and then turns eastward in its course toward the seaboard. The river distance from Moundsville, the county seat, to Pittsburg is 109 miles, to Cincinnati 371 miles. The shortest distances by rail from Moundsville are: to Wheeling 11 miles, to Pittsburg 82, to Parkersburg 83, to Martinsburg 268, to Baltimore 382, to Huntington 204, to Charleston 218, to Cincinnati 278, to Chicago 478 miles. The county is principally rolling in character, with wide bottom lands along the Ohio river and the several streams that pass through the county and flow into the Ohio.

COAL.—Marshall has no surface coal, but the entire county is underlaid with two veins of the Pittsburg coal. The first is about 4 feet thick and is found at a depth of from 80 to 100 feet below the surface. The other, at a depth of 150 feet, is about 6 feet thick. This is a good fuel coal and coke is sometimes made of it, but is not really a good coking coal. It is considered very good for fuel and is mined cheaply. Two mines are operated in the county, by means of shafts. The report of the State Mine Inspector for the first district shows that for the year ending June 30, 1891, the production of coal in Marshall county was 118,242 tons, and for the year ending June 30, 1892, the production was 166,893 tons.

TIMBER.—Perhaps a fourth of Marshall county is still covered with good timber, though a great deal has been going out constantly for many years. What is left is principally oak, though there is also a good deal of very fine poplar, particularly in the southeastern part of the county. There is some walnut left but not in large quantities. The accessibility of the timber of Marshall county is not to be overlooked. The hills are not steep and the land is well watered with streams that may be used to float timber. The county is also well supplied with railroad transportation, and is close to the markets of Wheeling and Pittsburg. There is also in the county a great deal of hickory timber suitable for use in wagon making and for other purposes. It is easy of access and is being used to a considerable extent. There is a great deal of tanbark in the county, which might be profitably gotten out.

CLAYS.—Clays of several kinds are found in this county, suitable for making the ordinary red brick, fire brick, sewer pipe, tiling and other materials made from clays. The growing favor with which brick pavements for roadways are regarded, and the abundance of suitable clay for their manufacture in Marshall county seem to indicate that this will some day become a great brick making region.

STONE.—Building stone of excellent quality and in the greatest quantity is found throughout the county. It is in tremendous ledges and may be quarried at a trifling cost. Limestone is abundant in portions of the county and may be used for building, fluxing or agricultural purposes. There is also found in the county a bank of cement rock, from which a good quality of cement may be made. Furnace sand for foundry and rolling mill purposes is found in abundance and is already shipped to some extent to furnaces in the neighboring cities where it is considered excellent for the purposes required.

OIL.—Some natural gas and oil have been discovered in this county, though they have never been found in large or profitable quantities. But the county is in such close proximity to the paying oil regions of Pennsylvania, Ohio and West Virginia that it is probable that oil will one day be found here.

Salt water has been found in great abundance, but has never been utilized.

AGRICULTURAL.—Marshall is one of the best agricultural counties

in the State. A large proportion of the county is river bottom land or creek bottoms, and very productive, while no part of the county is so high or hilly that it is unfitted for farming. Crops of all kinds as well as fruits yield well and are raised largely. The soil is principally a rich loam and the nearness of the county to the city markets makes it well adapted to market gardening. Grass grows luxuriously and makes the county a suitable one for stock raising. More attention has been given of late to the stock and much improvement has been noted in stock of all kinds. Sheep are principally raised, and like all the wool from the "panhandle" counties, that from Marshall county sheep commands a high price in the markets. Agricultural pursuits are the principal sources of wealth in Marshall county and much suitable property for farming or grazing purposes may be secured.

BENWOOD, with a population of 2,934 is a manufacturing suburb of Wheeling, which has sprung up in the last ten years. Large nail and glass works and other factories are located in the town, which is in reality a part of Wheeling.

MOUNDSVILLE, where the State penitentiary is located, is a prosperous and growing town, with brick paved streets and other evidences of enterprise. It is becoming a manufacturing town. The population in 1890 was 2,688, an increase of 51.52 per cent. in ten years.

MASON COUNTY.

LOCATION AND CHARACTER.—Mason is one of the Ohio valley counties, lying along the western border of the State, directly west of the center. The Ohio river, which marks the western boundary of the county, bends in such a way that about a fourth of the county is surrounded on three sides by it. In a northwesterly direction, dividing the county almost equally, flows the Great Kanawha river, pouring its waters into those of the Ohio at Point Pleasant. With a river frontage of 56 miles on the Ohio and 18 miles on either side of the Kanawha, with an average river bottom width of a mile, it is seen that about a fourth of the county is river bottom, and that consequently this is an exceedingly fine agricultural county. The greater portion of the county is not rough, though there are some high lands. The latter are in a measure

level, forming what are known locally as "the flats." But some parts of the county are quite rough and hilly. Situated, as it is, upon two navigable rivers, the county is afforded the advantage of the cheapest transportation in the world in three directions. The rivers are seldom so low that no boats can run and for the greater part of every year both are navigable for the larger steamers. Along the shore of the Ohio river runs the Ohio River railroad the entire length of the county, while along the north bank of the Kanawha passes the Kanawha and Michigan railroad, connecting the capitals of Ohio and West Virginia. From Point Pleasant, the county seat, to Wheeling is 172 miles, to Huntington 43, to Charleston 56, to Cincinnati 204, to Richmond 425, and to Chicago 497 miles. The distance by river to Pittsburg is 277 miles, to Cincinnati 203, to Charleston 60.

COAL.—The entire county is underlaid with coal. The Pittsburg seam, which in the neighboring counties is below the ground, here appears above the earth and is mined at nine places in this county. There are two veins of 3 and 6 feet respectively. South of the Kanawha river the coal is not found, but on the north of the river these veins are found. The coal is that excellent kind always seen in the Pittsburg seam, which is good fuel, gas and coking coal, all in one. The reports of the State Mine Inspector for the second district, show that for the year ending June 30, 1891, the coal output of Mason county was 116,598 tons, while for the year ending June 30, 1892, it was 123,323 tons. The number of employes about the mines increased from 264 in 1891 to 305 in 1892. The coal from Mason county is used in all the towns near the mines and is in great demand in other places. A great deal is shipped, principally by rail.

SALT.—For many years salt has been made in Mason county. Many of the furnaces that were at one time operated have gone to decay, and their ruins may be seen in passing through on the train. But there are five salt furnaces now in operation, making an average of about 720 barrels of salt a day, each containing 7 bushels—in other words, about 5,000 bushels a day are produced in Mason county. The brine is found at a depth of about 1,000 or 1,200 feet and is pumped into the vats in the furnaces, where it is boiled and the water evaporated, leaving the crystallized salt in the vats. The salt

is made cheaply and the cheap Ohio river transportation enables the makers to compete with all other salt and still make a reasonable profit. West Virginia salt has always had an excellent reputation, and still maintains it. Salt may be found at almost any point along the Ohio river in Mason county.

STONE AND CLAY.—A handsome grey sandstone, suitable for building and paving purposes, is found in great abundance. It is valuable for masonry of all kinds and many quarries are operated in the county. Bridge piers in the Ohio and Kanawha rivers are made from this stone and do not seem to be affected by the action of the water.

An excellent article of fire clay is found in considerable quantities at and near Mason City, a town in Mason county, on the Ohio river, where cheap transportation would be afforded should the clay be worked.

TIMBER.—All that part of the timber which was most easily accessible has been taken out and the land converted into farms. And yet a fourth of the county is still covered with timber. The greater part of the timber is oak and poplar, though there is some very fine walnut that has been preserved from the destruction that is going on among most of the walnut timber of the State There is also considerable hickory timber in the county. There are numerous streams in the county, emptying into the two rivers, on which timber may be taken to market with little difficulty. There are several saw and stave mills and one large furniture factory that are all working native timber. Railroad ties are gotten out in considerable quantities. Cheap fuel and cheap raw material offer inducements to wood working establishments of all kinds.

AGRICULTURAL.—From the days when the Indians lived in the valleys which meet in Mason, and fought with the whites for the possession of the soil, many evidences of which still remain, the lands of this county have been farmed. And the broad river bottoms are most inviting still. Wheat yields from 25 to 30 bushels an acre, and is the principal crop in the valleys. Corn is also a staple and the yield is large. Some are on record of from 100 to 125 bushels an acre. Blue grass is indigenous to the soil and Mason is one of the principal grazing counties of the State. Blooded horses, cattle and sheep are raised and some very fine animals are

bred. Race horses are numerous and some world's records are held by Mason county horses. Cattle are bred, both for milk and beef. Very fine beef cattle are raised and large numbers of them are shipped. Sheep are receiving special attention and many more are now raised than have been heretofore. The blue grass grows beautifully, and some magnificent pasturage is afforded, unexcelled by that in any part of the country. All kinds of farming prove profitable and very few of the farmers are not prosperous. The county is a good one for fruit, and a good deal of it is grown. Quite a reputation is being secured by Mason as a melon raising county. Last year 1,400 acres in this county were planted in melons, and one man shipped 20,000 crates of "nutmeg" muskmelons, the kind so much used for pickling.

MERCER COUNTY.

LOCATION AND CHARACTER.—Next to McDowell the southernmost county in the State and slightly to the east of it is Mercer county. The East River mountains separate the county from the State of Virginia, while the Flat Top and other mountains are within the limits of the county. New river touches the eastern corner of the county in its northward course and through the western part of the county flows the Bluestone, a tributary of the New river. Though high, the county is not very mountainous, the principal part being a high rolling plateau, with some mountains, but not enough to cut the county up much. It is not as rough and broken as the adjoining counties and contains some good farming country. The elevation of the county gives it an excellent atmosphere and healthful climate. Along the entire southern border of the county runs the Norfolk & Western railroad, several short branches of which penetrate the county in various directions for the opening of coal mines. Another railroad down the New river to Hinton, connecting the Norfolk & Western and the Chesapeake & Ohio railroads, is projected but has not yet been begun. At present the Norfolk & Western railroad is the only means of transportation afforded the people of the county, the distance by way of which from Bluefield, is 365 miles to Norfolk, 364 to Cincinnati, 219 to Huntington, 269 to Charleston, 434 to Wheeling and 524 to Chicago. Princeton, the county seat, is off the railroad about 10 miles from Bluefield.

COAL.--Mercer is partially in the Flat Top coal field. West of the Bluestone river over a territory about 3 by 14 miles the coal is found. Its thickness in Mercer county is not as great as in the adjoining county of McDowell, being but about 7 feet on the average, while in McDowell it averages about 10 feet. There is but one vein in Mercer county, but it contains some of the finest coal in the country. The field is pretty well opened up but there is still an abundance of coal untouched in the county. As in McDowell, the coal lands are held principally by a few large corporations which lease to operators on favorable terms. The coal is of the same vein, and exactly the same in character as that found in McDowell county. The reports of the State Mine Inspectors show that for the year ending June 30, 1891, there were 13 coal mines and 714 coke ovens in Mercer county, employing 2,104 men, producing 1,210,723 tons of coal and 254,780 tons of coke. For the year ending June 30, 1892, the number of coal mines was 17, coke ovens 734 with 12 under construction, number of employes 1,962, coal production 1,175,141 tons, coke production 88,297 tons.

IRON.—The county is one of those eastern border counties of the State all of which contain more or less of iron ores, and in Mercer are found large deposits of brown hematite ore. No developments have ever been made of this ore but its quality is known to be good and the mountain ranges along the eastern border are filled with it. Being in the iron region of the two Virginias, with plenty of good limestone at hand and in the heart of the finest coking coal field, Mercer county will some day probably become a large iron producing county. While not existing in as large quantities as in some of the adjoining counties, there is still a large amount of it and in paying quantities in Mercer county.

MARBLE AND STONE – The county contains an abundance of limestone, suitable for building and agricultural purposes and for fluxing. It is in large quantities, easy of access and easily quarried. There is in the mountains along the border of the county a fine variegated marble which has not been developed, but specimens of which show it to be a beautiful marble and of excellent quality. There is also a good millstone grit in a portion of the mountains of the county.

CLAYS—Fire and potter's clays are found in the county in large

deposits and the potter's clay has been worked, all kinds of pottery being made in the county. The clays are also useful in making brick for the construction of coke ovens, a great many of which are required, and for general building purposes. There is great demand for brick in the county which is growing up very fast and requires a large amount of building material.

TIMBER—A good deal of the timber has been removed from the county, but perhaps a half of it is still standing. The timber is principally the hard woods, with some poplar and a little pine in the higher parts of the county. Mercer never was a specially fine timber county and does not now rank well up among the best timber counties of the State, but, for all that, there is still some very good timber in the county. Much of it is being used at home and some shipped over the Norfolk & Western, though the principal item transported over that road is coal or its product, coke.

AGRICULTURE—The county is well adapted to some kinds of agriculture. Corn grows very well and tobacco on the new, high ground, produces excellent crops. The county, though, is especially adapted to grazing. Grass grows luxuriantly over all the land, most of which is high limestone land, and makes excellent pasturage. Cattle and sheep do well, though few are raised as yet, most of the country being given up to mining. Fruits do well but are not much cultivated.

BLUEFIELD is a town of almost magic growth, being but a few years old and claiming now 5,000 people. It is dependent on the coal and coke industries of Mercer and McDowell counties. It is an enterprising place and growing rapidly.

MINERAL COUNTY.

LOCATION AND CHARACTER.—Mineral county is in the north-eastern part of the State, the second county west of the eastern "panhandle." It is one of the border counties, being bounded on the west, north and for a short distance on the east by the State of Maryland. Forming the boundary of at least one half the county is the Potomac river, the dividing line between the two States. Following this river, sometimes on one bank, sometimes on the other, are the Baltimore & Ohio and the West Virginia Central & Pittsburg railroads, which have parallel lines for half the length of the

county. Leaving the W. Va. C. & P. at Cumberland, Md., the B. & O. continues eastward, while from Piedmont, where they again separate, the W. Va C. & P. extends southward to the interior of Randolph county. The Cumberland & Pennsylvania railroad runs from Piedmont through Maryland to Cumberland, touching Mineral county at each end. From Cumberland eastward, on the Maryland shore, runs the Chesapeake & Ohio canal. From Keyser, the county seat, it is 102 miles to Martinsburg, 202 to Baltimore 183 to Parkersburg, 179 to Wheeling, and 646 to Chicago. Through the county run several parallel mountain ranges, at the base of each of which is a broad valley. This alternation of mountains and broad valleys makes up the entire county. The mountains are not the "hog-back" ridges, such as are found in some parts of the State, too steep and sharp to farm, but are flat on top and most of the county is thus level and suitable for farming. Through the county flow several streams, watering the county well and affording means for floating out logs.

COAL.—Only in the extreme western part of Mineral county is coal found, but there are in that part of the county no less than five veins of very fine coal, aggregating over 30 feet. One of these is the celebrated "14 foot vein." One is 7 feet, one 6, one 4 and one from 1½ to 3 feet thick. The coals are bituminous and semi-bituminous, the latter including the "peacock" coal. The 14 foot vein is the Pittsburg vein, and is very valuable for steam and smithing purposes. Coke has not been made yet in this county, though the coal is suitable for coking. The "big vein," which is the only one worked in this county, varies a little in thickness, running up in places to 16 feet and down to 13 in others, but 14 feet is the average thickness. This is solid coal, too, without any slate or parting in the vein. East of Piedmont no coal is found. The reports of the State Mine Inspector show that for the year ending June 30, 1891, there were produced from the eight mines operated in Mineral county 623,067 tons of coal. In each of these mines the vein is 14 feet thick except in one where it is but 13. The number of miners and employes was 666. For the year ending June 30, 1892, the number of employes was 608, the number of mines worked 5, and the output 473,862 tons of coal.

IRON.—In Abram's Ridge, just east of the New Creek mountains,

which extend from north to south through the centre of the county, iron ore is found in great quantities. The deposit of ore is said to be from 60 to 70 feet thick, but has never been developed. "Billions of tons" is the expression used to denote the quantity of the iron ore by one who knows more about it than any other person, and its extent is over the entire length of the mountains in the county. The ore is not so rich as that found in some of the adjacent counties, but is in large quantities and of paying quality. It is a brown hematite ore, containing from 30 to 40 per cent. metallic iron. This ore is easily accessible and in close proximity to the splendid coals and limestones to be found within the boundaries of the same county and within a few miles of the iron ores. It would seem to offer an inviting field to the iron producer and capitalist.

STONE.—A portion of the county is of limestone formation and a portion sandstone. Of both kinds there is an abundance of good building stone, which can be quarried cheaply. Some of the limestone is very pure and an exceedingly fine quality of lime is burned. The lime from West Virginia limestone stands high in the markets and more might be profitably made in Mineral county.

CLAY.—Fire clay is found in great quantities in many parts of the county and brick are made to a limited extent. Clay suitable for the manufacture of fire brick and tile is found in abundance and some potter's clay, though the latter has never been developed.

TIMBER.—Good timber, principally oak, poplar, chestnut, ash, lynn and similar woods, covers still more than half the county. On lands that have been cleared there still remains sufficient timber for farming and fencing purposes, but the timber that is valuable for sawing is in large tracts on the mountains, principally in the western part of the county. Until recently the south-western part of the county has been inaccessible and little of the timber had ever been taken out until the construction of the W. Va. C. & P. railroad along the border of the county opened the territory along the upper Potomac and afforded the means of transporting the timber. Since that time large forces of men have been at work and the timber is being rapidly removed. Still there is a great deal left of excellent quality.

AGRICULTURAL.—The county is similar in many respects to all of

the counties of the South Branch valley, and the soil is just as fertile. The long parallel valleys between the mountain ranges are broad and contain as fine farming lands as can be found in any part of the State. The soil is principally a sandy loam and reaches an average depth of many feet. That on the hills is not so deep, but is very fertile. Grains of all kinds in the bottom lands and high plateaus grow well and yield about as well as in any county in the State. Part of the county is limestone in character and blue grass grows and makes an excellent sod. Cattle and sheep are both raised and with considerable profit. The county is especially adapted to grains, cattle and sheep raising and fruit culture.

KEYSER, an important railroad town, has shops and yards of the B. & O., and is reached also by the W. Va. C. & P. It is a beautiful town and does considerable business as the center of an agricultural region. Its population in 1890 was 2,165, an increase of 41.36 per cent over 1880.

PIEDMONT is a thriving town on the banks of the Potomac. It has railroad shops and yards, large pulp and paper mills and other factories and important commercial interests.

MONONGALIA COUNTY.

LOCATION AND CHARACTER.—Along the northern border of the State, separated from the State of Pennsylvania by only an imaginary line, and about as far west of the Maryland line as it is east of the Ohio, is the county of Monongalia. The county like all those in this section of the State, is rolling and hilly and only in the extreme east of the county do the hills rise into mountains, the Laurel ridge reaching a considerable height there. Through the eastern part of the county the Monongahela river flows northward, and east of that is the Cheat river, also flowing northward and uniting its waters with those of the Monongahela just below the Pennsylvania line. The Cheat is not navigable at any part, but the Monongahela, improved with several dams, affords slack water navigation as far above Pittsburg as Morgantown, the county seat of Monongalia county. A branch of the Baltimore and Ohio railroad extends from Fairmont down the east bank of the Monongahela river to Morgantown, is being extended into Pennsylvania where a connection will be made with the B. & O. system in that State, and an-

other road is under construction along the west bank of the same river, which will also give connection with roads in Pennsylvania. Morgantown, the county seat, is 104 miles from Wheeling, 152 from Parkersburg, 228 from Martinsburg, 263 from Charleston, 347 from Cincinnati and 571 from Chicago.

COAL.—Six veins of coal, varying from four to eleven feet, are found in Monongalia county, in some places one above the other, so that in parts of the county there are from 20 to 30 feet of merchantable coal, all of which can be mined without shafting. Two measures cover the county—the Lower and the Upper coal measures. In the former are two veins of excellent coking coal, averaging about 5 or 6 feet each. In the other are four veins, averaging from 4 to 9 feet each. One of these is the great Pittsburg vein, one of the most important veins in the State, and as good a coking coal as can be found. The Monongalia coals stand high in the market, make excellent coke, are free from ash, sulphur and slate partings. Reports of the State Mine Inspectors show that for the year ending June 30, 1891, there was but one mine reported in the county, and 10 coke ovens, the production being 46,100 tons of coal and 4,900 tons of coke. For the year ending June 30, 1892, there were two mines reported, and 57 coke ovens in blast. The production was 70,062 tons of coal and 13,517 tons of coke. The completion of the railroad recently finished and the one now projected will give an impetus to the development of the mining industry, and a great mining region will doubtless be made of the Monongahela valley.

IRON.—In years past, before the completion of railroads into richer territory, there were as many as half a dozen iron furnaces in Monongalia county, but today none of them are operated, and the ores still remain stored away in the hills of the county. As many as nine seams of ore have been reported, ranging in thickness from 18 to 30 inches. The ores are carbonates of iron containing from 27 to 49 per cent metallic iron. The ores are found principally in the eastern part of the county.

OIL.—Monongalia county was one of the first in which the recent oil developments were made, and since the days of the shallow wells in the Little Kanawha valley, was among the first to produce oil. There have been and still are good producing wells in this county. The western part of the county is where the oil is found and there

are numerous wells there. Natural gas is found in profusion and is used for heating and lighting purposes at Morgantown and other places in the county.

STONE.—A good building limestone is found in the county and there are blue and gray sandstones throughout the county which are valuable for building purposes. They are pretty, hard and durable stones, which are valuable for building purposes. There is found a good glass sand in the eastern part of the county, which has been used for making glass.

CLAYS.—Several kinds of clays are found in the county, suitable for the manufacture of paving and fire brick, sewer pipe, tiling, terra cotta work, etc. In various parts of the county these clays are to be found and in some places they are worked. Most of them are on the east side of the river where they could be worked to advantage, and are near the railroad where shipping facilities would be good.

TIMBER.—Fully a third of the county is still in timber. A great deal of the timber of the county has already gone down the Monongahela and much of the better land for farming has been cleared, but there is still standing in the county a great deal of fine timber, consisting of the oaks and other hard woods, some poplar, but principally white oak, which is very fine. The eastern part of the county is almost untouched, much of the original forest remaining on the mountains. The facilities for getting out timber and the means of getting it to market would seem to offer inducements to persons in that line of business.

AGRICULTURAL.—Monongalia is a splendid agricultural county. The surface is but slightly broken, the only mountains in the county being in the eastern portion and the rest of the county being undulating or hilly, fertile and free from rocks. Grains, including buckwheat, do well in the county and a good deal of them is raised. West of the river the best land in the county is to be found and most of this possesses a rich and productive soil. Grass grows spontaneously in nearly every part of the county. The soil is for the most part a blue grass one and well watered, producing fine crops of grass. Cattle raising and the raising of all kinds of stock is therefore much engaged in and proves a profitable business. Fruits of all kinds grow well in the county.

MONROE COUNTY.

LOCATION AND CHARACTER.—Monroe is one of the southern border counties of the State, lying a little to the east of the most southern portion, and directly south of the center. To the south and east is the State of Virginia, from which it is separated by Peters and Potts mountains, portions of the main Alleghany range. The Greenbrier river flows around the northern portion of the county, forming its boundary for a short distance, while the New river which comes from the south and unites with the Greenbrier in the adjoining county, barely touches the southwestern corner of Monroe. The waters which flow into these rivers are well distributed through the county, which is thus well watered. In the eastern part, just west of the Potts mountain, is Potts creek, which flows northward and empties into Jackson's river at Covington, Va. The southern portion of the county is but a very short distance from the Norfolk & Western railroad, while the Chesapeake & Ohio railroad passes through the northwestern corner of it. Union, the county seat, is 12 miles off the Chesapeake & Ohio railroad, by way of which it is 137 miles from Charleston, 256 from Richmond, 402 from Wheeling, 348 from Cincinnati and 653 from Chicago. The county is mostly mountainous, and all high. A large part of it is rolling table land, interspersed with mountains, those along the eastern border being quite high—from 3,000 to 3,600 feet. The climate is delightful and healthful, and the county is much sought in the summer by persons in search of health. Monroe is one of the three counties in the State in which coal is not found. A kind of shale, resembling coal has been found, and some people have called it coal, but it is not. When placed with other fuel in a fire it will get red hot and emit a powerful heat, but does not burn and requires other fuel to make it hot. Even this is found in small quantities only.

IRON.—The mountains which mark the eastern boundary of the county contain enormous deposits of iron ores, and form a part of what is probably the richest iron field in the Virginias. Through the entire eastern extent of the county continuous beds of ore are found both in Oriskany and Clinton formations. The ore is brown hematite, containing from 46 to 58 per cent. of metallic iron, averag-

ing about 52 per cent. It is all above water level and easily mined by simple open cut work. The Oriskany bed, which covers the eastern part of this county and extends on down the valley into Virginia, where it is mined and used in numerous furnaces, is found to be in various places from 5 to 15 feet thick, oftener the latter. It is a neutral ore, out of which a high grade of iron can be made without a mixture of ores. Above the Oriskany beds is found the Clinton ore. This, in extent, is equal to the Oriskany, but not quite so thick, ranging from 3 to 10 feet. Judges Holt and Snyder, of the Supreme Court of Appeals of West Virginia, in a paper on the iron ores of this State and Virginia, reach the conclusion that: "It would be within the just limits of the facts heretofore given to estimate that in the Potts' valley, along the Potts' and Peters' mountains, their foot-hills and ridges, there are one hundred miles of outcrop of brown Oriskany ore (Rogers VII), to say nothing of the large quantity of Clinton ore (Rogers V), of an average thickness of ten feet, that can be stripped and mined six hundred feet above water level, which, allowing two and one-fourth tons to the cubic yard of ore, would yield 233,000,000 tons of ore, and taking three hundred days as a year, this would run one 100-ton furnace 4,000 years or forty 100-ton furnaces for one hundred years." There was, some years ago, a small furnace in the eastern part of the county, where an attempt was made to make pig iron. The force of men went to sleep on the first attempt, the big cupola burst and no further effort was made to operate it. It has recently been purchased by eastern men who propose to operate it as soon as railroad communication can be secured. The dozen or more furnaces now being operated in the western part of Virginia, within a short distance of the Monroe county iron, are all using the same ore that is found here and are being worked successfully.

MANGANESE.—Some little manganese is found in the mountains along with the iron ores, but little is known as to its extent or value. There is probably a good deal of it stored away in the mountains.

STONE AND MARBLE.—The county is in the midst of a limestone outcrop and the limestone is so prevalent in places that there is scarce room for any soil. There is the greatest abundance of it for building, road making, agricultural and fluxing purposes and for

burning lime. Sandstone is found in places, but there is very little of it, compared with the vast quantities of limestone that exist. Some of the limestone is very fine and at times becomes marble. Several quarries of fine black and grey marble are found and it is claimed by some that there is a lithographic stone in one part of the county. The marbles and lithographic stone are little known, few investigations ever having been made as to their value or extent.

MINERAL WATERS.—Monroe has perhaps a greater variety and abundance of mineral waters than any other county in the State. There have been since long before the war numerous fashionable summer resorts in the county, where people go to escape the heat of other places and to drink the health-giving waters of Monroe. The waters have various properties and are beneficial in a great many of the ills that flesh is heir to.

TIMBER.—Monroe was never a well timbered county. There was an abundance of small growth, but little good saw timber, and probably not over a tenth of the area of the county is now covered with valuable timber. What is left is principally oak, cherry, chestnut and maple, with a little pine in small tracts. Sugar maples are left in places for the sap, but are not of much account for timber. There is considerable small timber suitable for railroad ties, telegraph poles, hickory for wagon material and a good deal of tanbark but as a timber producing county Monroe does not rank well.

AGRICULTURAL.—The limestone soil of this county produces a most excellent blue grass sod and, along with Greenbrier, the adjoining county and quite similar in most respects, Monroe bears an excellent reputation as a cattle raising county. The ground, where cultivated, produces well and all kinds of grain are raised. Corn, oats, wheat and buckwheat are the principal crops. In the western part of the county very fine tobacco is raised The soil there seems to be especially adapted to the culture of tobacco and there is a great deal of it grown. The people are principally from old Virginia and they all understand the culture of tobacco Grazing is the principal industry of the county and fat cattle in great numbers are sent out of the county every year. All kinds of stock are raised—fine horses, hogs and sheep as well as cattle. Sheep are very profitable. In much of the land the limestone crops out so thick that it is im-

possible to plow it and on this land where there would seem to be hardly room for the sheep to step without standing on rock, they pick up a splendid living and thrive. It is good for nothing else and the blue grass grows spontaneously, and sheep raising is the only way to get any yield at all out of the land. This rocky land is not prevalent in the county and there is much very fine pasturage. The people find stock raising profitable and there are many opportunities to purchase good farms cheap. The high, rich lands of this county are admirably adapted to fruit culture and principally improved varieties are cultivated. Fruits of all kinds are very fine and yield well.

MORGAN COUNTY.

LOCATION AND CHARACTER.—Morgan is one of the three counties in the eastern "panhandle" almost separated from the rest of the State, being connected by a narrow strip only at the northeastern corner of Hampshire county. To the north is the State of Maryland, and the southern corner borders for some distance along the State of Virginia. The northern boundary is the Potomac river, on the West Virginia side of which is the Baltimore and Ohio railroad, and on the other the Chesapeake and Ohio canal. The Great Cacapon river flows northward through the western part of the county into the Potomac river, and Sleepy creek waters the eastern part of the county. Berkeley Springs, the county seat, is reached by a branch line from the Baltimore and Ohio railroad, 5 miles long. The distance from here to Martinsburg is 28 miles, to Baltimore 128, to Parkersburg 262, to Wheeling 258, to Chicago 725 miles. The county is principally mountainous and rocky, though the valleys of the streams are fertile and of good width.

COAL.—Morgan is one of the two counties in West Virginia, in which anthracite coal has been found. From six to ten thousand acres are embraced in the field, lying in the counties of Berkeley and Morgan. The first anthracite coal found in the State was in Morgan county. It was a 6 foot vein. The shaft which had been dug was unprotected, soon filled with water and was abandoned This field being the same as that in Berkeley county the description under the head of that county will answer for this also. Further information may also be had in the chapter on coal, in this volume. There is no bituminous coal in Morgan county.

IRON.—Iron ores in abundance have been found in Morgan county, principally brown hematite, and are shipped in considerable quantities to furnaces in Pennsylvania, where they are made into pig iron. The ores are found principally in the Sandy ridge, which passes north and south through the center of the county. Some other iron ores are found, but they are of little importance.

LIMESTONE.—This section of the State seems to contain about the purest limestone found in any part of it. The lime burned from the stone found in this and adjacent counties is of excellent character and sells well. Burning lime is quite an industry in this county and a good deal is made.

GLASS SAND.—The Sandy ridge, in the center of the county, is almost entirely composed of a white sandstone which is nearly pure silex and said to be the finest glass sand in the world. There are several quarries where the stone is gotten out and crushed. The sand thus obtained is shipped to glass factories all over the country and its preparation forms one of the principal industries of the county. The sand is also used by the railroad company on its locomotives where sand must be carried to keep the wheels from slipping. But it is too valuable to be used in this way long, and while the county is full of it, more pains will be taken in the future to preserve it for the purpose to which it is so well adapted.

CLAY.—A good potter's clay has been found in small quantities in the county and was at one time worked, but it has lain untouched now for many years.

TIMBER.—Perhaps one half the county is still uncleared, but not all of this is in timber that is valuable for lumber. Still there is a large amount of good timber standing. It is principally white, red and chestnut oak, some of these varieties growing to immense size, hickory, poplar, ash, walnut and cherry. Not much is gotten out for saw timber, but the amount of ties, staves, hoop poles and tanbark produced is large.

AGRICULTURAL.—The valleys of the various streams of the county are broad and fertile, and make fine farms. Much of the mountain land is not suited to farming, but makes excellent pasturage. The county is full of limestone and blue grass grows luxuriantly. Stock raising has come to be one of the principal industries of the county and all kinds of stock are raised. Horses and cattle do well but

particular attention is given to sheep, which are raised in considerable numbers and the probabilities are that sheep culture will be largely increased in the future, owing to the natural adaptation of the county to them. The county is also well adapted to the culture of grapes and other fruits, though little fruit of any kind is now raised. All that is grown, though, does well.

McDOWELL COUNTY.

LOCATION AND CHARACTER.—The southernmost county in the State is McDowell. Three sides of the county are almost surrounded by the State of Virginia and the county is bounded by mountain ranges. Rising in the eastern part of the county and flowing westward is the Tug fork of Big Sandy river, into which flow several tributaries of small size. Along this river, through the northern part of the county runs the new extension of the Norfolk & Western railroad, the first to penetrate the mountain fastnesses of the county and to bring to the reach of the world the abundant mineral wealth that is hidden away in its mountains. Practically a wilderness a few years ago with only a scattering population among the mountains and scarcely any degree of civilization, the county is now rapidly becoming one of the foremost in the State in a business way and the development of its coal is rapidly bringing the county into prominence. The Norfolk & Western railroad gives direct connection in all directions, by way of which Welch, the county seat, is 400 miles from Norfolk, 329 from Cincinnati, 234 from Charleston, 184 from Huntington and 399 from Wheeling. The county is principally rough and mountainous. Except along the railroad it is still in a very primitive state and even there the fact is evident that the country is a newly opened one. The topography of the county is similar to that of the neighboring counties except perhaps that here it is rougher and more broken.

COAL.—McDowell county is in the midst of one of the finest coal regions in the United States, the Flat Top field. An area about twenty by forty miles is underlaid by the finest coking coal known. The Flat Top coal has achieved a national reputation and the rapid development of the coal and the ready sale with which it meets attest the value of both the coal and the coke made from it. In Mercer

county there is but one vein of the coal, but in McDowell the vein separates and forms two veins about 60 feet apart, respectively 4 and 6 feet thick on an average. These thicknesses vary a little but the average of the two is about ten feet. The coal is a most excellent grade of the finest coking coal known in the country. It is a superior grate and steam coal, giving an exceedingly bright, hot fire. It is low in volatile matter and ash and high in fixed carbon. The coal property of the county is principally owned by two corporations who lease it out to mining companies on liberal terms. The reports of the State Mine Inspectors show that for the year ending June 30, 1891, the 20 mines of McDowell county and the 966 coke ovens, employed 1,497 men, produced 336,259 tons of coke and 704,871 tons of coal. For the year ending June 30, 1892, there were 25 mines, 1,992 coke ovens completed and 626 under construction, employing 1,655 men and producing 194,390 tons of coke and 1,100,882 tons of coal.

TIMBER.—But little of the timber of the county has ever been taken out and fully two thirds of the county is still in untouched forests, embracing all the finer kinds of the hard wood timbers of the State. Oaks of the finest quality and size are abundant and poplar is found in large quantities. The waters of the Sandy river afford an easy outlet for the timber of the county and the railroad, now opening up the country, also affords a means of reaching the market. The timber is being worked up now quite rapidly but there is still an enormous quantity of it standing in the county.

AGRICULTURAL.—The county is too rough and broken to afford much of an opportunity for successful farming. Corn in places grows well and there are some bottom lands and levels in various parts of the county which yield good crops. Grass grows well on most of the hills when once the timber is removed and the clearing of the forests will be followed by a greater cultivation of the soil and grazing is sure to become one of the principal forms of agriculture in the county. There is a good market for all kinds of farm products among the mines and towns that are springing up along the line of the new road.

NICHOLAS COUNTY.

LOCATION AND CHARACTER.—Nicholas county lies immediately south of the center of the State. Through the center of the county in a southwesterly direction flows the Gauley river, into which within the boundaries of this county flow the Cranberry, Cherry, Hominy and Meadow rivers and several smaller streams. The county is full of springs of the purest water and the streams are well supplied with water at all seasons of the year and the waters are seldom muddy. Gauley river is navigable at times for small push boats but the principal means of bringing goods into the county has been by hauling them from the Chesapeake & Ohio railroad. The completion of the West Virginia & Pittsburg railroad to the Gauley river in Webster county has given to the northern part of the county closer railroad connection than by the C. & O. Summersville, the county seat, is 30 miles from the C. & O., by way of which it is 68 miles from Charleston, 279 from Cincinnati, 361 from Richmond and 584 from Chicago. From the W. Va. & P. Summersville is about 15 miles, and by this way the distance is 241 miles to Wheeling, 299 to Baltimore. The county is largely mountainous and all elevated. Much of the county is an elevated and rolling plateau. The Gauley river for most of its course in this county, is cut down deep below the level of this plateau and its banks are high and steep. The mountains in some parts become quite high, but are not steep and may be cultivated to the tops. The roads in the county are mostly turnpikes and are all kept in good condition. A branch of the Chesapeake & Ohio railroad is under construction from the mouth of Gauley river up to the Nicholas county line from which point it will probably be extended up Twenty Mile creek into the western part of the county. The C. & O. Ry. Co. also contemplates the construction of a branch up the Meadow river through the southern part of Nicholas county, connecting with the main line of the C & O. east of the new river canyons.

COAL.—The conglomerate or New River coal measures cover the eastern portion of the county and some splendid beds of this famous coking coal, termed by Prof. White the "purest of coals," are found. The veins here do not reach the same thickness that they do further south but the coals are just as good and in workable

veins and it is to reach this field of fine coking coal that the Meadow river branch of the C. & O. is to be constructed. In the western part of the county the coal belongs to the Lower coal measures and several varieties are found. Splint and cannel coals are found in thin veins, which thicken as they go southward. The cannel coal of Nicholas county is most too thin to be of any value, but some good splint coal is found. A good coking coal is also found in large veins and over considerable area. Nine-foot veins are being opened up in the valley of Twenty Mile creek, toward which the C. & O. is pushing. To summarize: Workable beds of coal may be found over the entire county from 3 to 9 feet in thickness, including the best varieties of the New River and Kanawha coals. Coking, fuel, splint and cannel are found, the latter seldom in workable veins. Not a bushel of coal has ever been mined in the county except for local use and this immense territory of valuable and untouched coal is awaiting merely a developing hand to prove unquestionably its enormous value.

IRON—Little is known of the iron ores of this county save that there are rich veins of valuable black band ore. The ore crops out along Little Elk creek and in some other places but no efforts have been made to discover the value or extent of the ores.

STONE AND CLAY.—There is an abundance of fine building sandstone throughout the county and in some places good millstone and grindstone grits have been found.

Fire and potter's clays are found in abundance and a small pottery has been successfully operated in the county.

TIMBER.—Some of the finest timber in the State is found in Nicholas county and the best of it all remains untouched. From not over a fourth of the county has the timber been removed and some magnificent forests yet remain. Along the eastern border and extending into Greenbrier, Pocahontas and Webster counties is what is called "The Wilderness," where a space 25 miles square is said to be without a human habitation. Unbroken forests cover this entire region, deer paths being the only openings. A large part of this is in the "yew pine region" and there is a great deal of black spruce as well as other kinds of timber. Most of the spruce, though, is in that portion which is in the other counties and poplar and the hard woods are the most prevalent ones in Nicholas. Much

of the land has been owned in large tracts and the timber has been saved, although a great deal of very fine quality has been taken down Gauley river. Poplar has been cut more than any other kind and still covers the greater part of the county. The roads pass through these forests in many places and the traveler passes along through the midst of thousands of acres of splendid poplars, from four to eight feet thick and 50 feet or more to the first limb. Oaks of enormous size grow also in abundance. Besides the oaks and poplar the principal timber trees of Nicholas county are hickory, chestnut, cherry, ash, lynn, walnut, maple, beech, birch, locust and holly. There has been a good deal of fine walnut in the county but it is being rapidly removed. There is enough of the other kinds still standing, though, to last the largest mills for years to come. A few mills are located in the county and some logs are taken out the Gauley to be sawed at other places but the timber supply is being almost imperceptibly reduced by this.

AGRICULTURAL.—Though blessed with magnificent timber forests and rich deposits of minerals, Nicholas is still essentially a farming county. The soil is rich and much of the land lies well. The broad open area of the plateau land that forms a considerable portion of the county, makes excellent farming land and it is utilized for that purpose. Grains grow well and so does grass. Corn is the principal crop though wheat and the other cereals all yield well. The county is a splendid one for grass and blue grass flourishes. The farmers all raise cattle though the stock has not the reputation of that from some of the surrounding counties. Sheep are raised to some extent and it is an excellent county for them, adapted by soil, character and climate. The rich uplands are particularly suited to fruit culture and all kinds of fruits grow well. Apples, peaches and grapes are grown equal to the best the markets afford anywhere in this part of the country.

OHIO COUNTY.

LOCATION AND CHARACTER.—About the centre of the northern panhandle, that narrow strip wedged in between Ohio and Pennsylvania in the extreme north of the State, is Ohio county. Brooke and Hancock are the only counties north of it, also the only ones in the State of smaller area. Though one of the smallest counties in

the State in size, it is second in population and contains the largest city in the State. The county is similar in topography and character to the other panhandle counties. None of it is very high, though the greater part of the county is hilly. Some of the hills are rough and steep but few of them too steep to be of value for farming, grazing or some other purpose. The Ohio river forms the western boundary of the entire county, by way of which Wheeling, the county seat, is 96 miles from Pittsburg, 384 from Cincinnati. By rail Wheeling is 71 miles from Pittsburg, 280 from Martinsburg, 94 from Parkersburg, 228 from Charleston, 215 from Huntington and 467 from Chicago. Several railroads pass through Ohio county, the Baltimore & Ohio and Pennsylvania systems being the largest. The Ohio River railroad connects all the western counties of the State while numerous other roads from Ohio cross the river into Wheeling, making this a splendid shipping point and placing the county in direct communication with all parts of the country. The county is well supplied with splendid roads. The National road and all the rest are carefully looked after and well kept up Several streams flow through the county and empty into the Ohio river, but all are small. The county is the most thickly settled in the State.

COAL.—The Pittsburg seam of coal is found in Ohio county and is worked in half a dozen places in the county. The vein averages 5½ feet in thickness and the coal is of an excellent quality, being used exclusively in many of the large iron working mills of Wheeling. The principal vein is found at Wheeling about a hundred feet above the water level and this it was which formed the basis of Wheeling's early prosperity and caused its growth to its present large proportions. The reports of the State Mine Inspectors show that for the year ending June 30, 1891, the coal production of the county was 80,738 tons. For the following year it had increased to 82,534 tons. The coal is all mined exclusively for local use, little, if any, being shipped outside the county.

STONE.—Good building stone may be found in any part of the county both sand and limestones being abundant, and much of it has been used in the many handsome buildings which are to be seen in Wheeling.

CLAY.—In Ohio county several kinds of clays are found in

abundance. Brick clay, fire clay, potter's clay and a cement clay, from which cement is made, are all found in large quantities. They form the foundation on which are built some of the most substantial industries of Wheeling. Potteries, brick and fire brick works are numerous and employ a large number of men.

TIMBER.—So thickly populated as the county is and has been for years, with all the land made valuable by its proximity to the city, but little timber has been allowed to stand, and to-day the entire county is practically stripped of all its timber.

AGRICULTURAL.—The soil of the county is uniformly good and most of it is worked. A dark loam, rich and productive, it is adapted to nearly all kinds of crops and produces splendid yields. Wheat and corn are grown to some extent, garden products in great quantities, while all the land, on the hills as well as in the valleys, produces most excellent grass. There is a good deal of limestone in the county and the blue grass grows magnificently, the county sharing with the others of the panhandle the excellent reputation which they have as grazing counties. Sheep, cattle and horses are largely raised, particularly the former, which yield a wool of most excellent quality, commanding a high price in all the markets. In grazing or in farming about all the land in the county outside of the city is under cultivation and ready markets are found at home. Many tomatoes, cucumbers, etc., are grown for the catsup, canning, pickling and preserving works of Wheeling.

WHEELING, the largest city in the State, claims 40,000 people. The census of 1890 gave the city 34,522, an increase in ten years of 12.31 per cent. This, however, does not represent the real population of the city. The numerous suburbs, in all except in name a part of Wheeling, would nearly double the population of the city as given above. It owes its prosperity almost exclusively to its manufacturing interests. Millions of dollars are represented in the capital employed in manufacturing in the city. At one time Wheeling was the greatest nail producing city in the Union and was given the name of "the Nail City." But other manufacturing has taken its place since then and nails are but a small part of the product of the city's factories. The principal factories now in operation are the iron and steel works, wood working establishments, glass factories, potteries, breweries, tobacco houses, canning, pickling and pre-

serving works. As showing the volume of the manufacturing business in Wheeling the following figures of the exports from Wheeling for 1890 will be of interest. The tons sent out of Wheeling in that year were as follows: Pig iron, 380,000; steel, 328,000; muck bar, 68,000; nailplate, 140,000; nails, 132,000; bar, sheet and plate iron and steel, including galvanized and corrugated iron, roofing, etc., 115,000; steel pipe, 30,000; glass, 18,000; merchandise, 100,000; miscellaneous manufactures, including pottery, 140,000; wool, 1,200; total, 1,452,200

The following is but a partial list of the more important industries or manufactures of the city of Wheeling: Bessemer foundry and pig iron; bessemer steel ingots, billets and nail plate; steel nails and spikes; steel, iron and sheet steel; bar iron, bar steel and rails; plate iron and steel plates; galvanized and corrugated iron and steel; cold rolled iron and steel; iron roofing and car roofing iron; iron cornices and shaped iron for builders; iron and steel axles; stoves and grates; hollow ware; engines and boilers; nail machines; steamboat machinery; iron vats and tanks; iron chimneys and stacks; machinery and castings of all kinds; tacks, hob nails and wire nails; general iron castings and forgings; iron and metal ceiling; wire signs, netting and wire work; flint and lead glass table ware; cut glass; glass chandeliers; lanterns and lantern globes; bottles, flasks, jars and cruets, crystal and colored; table queensware; porcelain china; decorated ware; pottery of all kinds; wagons and carriages; sashes, doors, and shutters; barrels, kegs, staves and bungs; sawed and planed lumber; furniture; pork packing; flour and meal; roasted coffee; baking powder; ground spices; mustard for fine fancy trade, and in bulk; mince meat, canned goods, preserves and jellies; catsup; pickles; horse radish; soap and candles; illuminating and lubricating oil; calico; stockings; gloves and suspenders; leather; sails, awnings and tents; brass and bronze casting; copper kettles; electro plating; galvanizing; cigars and smoking tobacco; beer, wine and ale; bricks, lime and cement; chemicals; artificial ice; glue; saddles and harness; trunks and valises; monuments and headstones; patent medicines.

Not only as a manufacturing city is Wheeling known, but it is a city of great and growing commercial importance. Business interests are very large. Wholesale houses do a tremendous business

throughout this State and others The city has excellent rapid transit using both steam and electric power, plenty of bridges, excellently paved streets and all that goes to show progress and enterprise in a growing city. The Wheeling *Intelligencer*, in a recent issue, said: "From her infancy Wheeling has enjoyed a prestige in the surrounding country for her culture. Her churches, her schools, public and private; her literary and social circles, her press, all have always compared with the best anywhere. Her streets and her business houses, her homes and public buildings are modern and tasteful. Her physicians are skilled, her lawyers shrewd and learned, her people progressive and public spirited. The city impresses the visitor not as a town of 40,000 people, but as one of the leading metropolises of the country. Indeed, her population, while nominally not 40,000, should be, as large cities count, several times that. North and south of her, on both sides of the river, is a population equal to her own, tributary to her—a homogeneous population of 75,000. They are in all but nominal extent of the city limits a part of the population of Wheeling. Easy access to the business establishments, the theatres and the other facilities of the larger city have made Bellaire, Bridgeport, Martin's Ferry, Benwood and other near-by towns, all of considerable size, substantially parts of the greater Wheeling, and inured to the material advantage of them and her alike. Creditable as her position among the communities of America has always been, Wheeling is but entering upon the career which she is destined to have. An era of enterprise, of progress, of metropolitan energy and vigor is opening. On all sides signs of it are seen; and as West Virginia moves forward in the line of her destiny, her metropolitan city will always be found abreast of the vanguard– possibly still a little in the lead."

PENDLETON COUNTY.

LOCATION AND CHARACTER.—Along the eastern border, directly east of the center of the State, is Pendleton county. On the east and south of it is the State of Virginia. In the southern part of the county, near the headwaters of the South Branch river, is Panther Knob, the highest point in the State, the altitude of which is shown by the aneroid barometer to be 4,800 feet above sea level. The entire county is high, but rises gradually from the northern to

the southern end, which is the dividing ridge between the waters flowing north and those flowing south. Near the southern border of the county is a barn, from the roof of which the water runs in opposite directions. That from one side of the barn flows north into the Potomac river, from the other south into the Jackson and James rivers and the waters of the two unite again in the Chesapeake bay. The South Branch of the Potomac and the North and South Forks of the South Branch all rise near the southern end of Pendleton county and flow almost parallel northward, uniting in the counties below. Though rising in a high altitude, their fall is slight and gradual so that their course might easily be followed by a railroad with very little necessity for cuts or fills. Between and on either side of these streams are parallel ridges of high mountains, extending on into Grant, Hardy, Hampshire and Mineral counties, which are very similar in most respects to Pendleton county except that the valleys in Pendleton are neither quite so wide nor so fertile as in the lower counties. The air and water are pure and fresh, the scenery beautiful, the climate delightful. Only better connection with the outside world is needed to make this one of the most desirable residence portions of the State. The nearest railroad point to Franklin, the county seat, is Harrisonburg, Va., which is 40 miles distant across rough mountain roads and several ridges. It is 70 miles down the South Branch valley to Keyser and the B. & O. railroad. By Harrisonburg the distance to Charleston is 299 miles, to Richmond 202, to Baltimore 195, to Cincinnati 510. By the B. & O. the distance to Wheeling is 250 miles, to Chicago 717.

COAL.—A small quantity of coal has been found in the north western part of the county—merely enough to say that there is coal in the county and no more. It is bituminous coal and is found near the tops of the mountains, from which it dips westward and passes into the counties beyond.

IRON.—The principal natural resource of Pendleton county is its iron, which is widely distributed and very valuable. Years ago, before the war, some iron was made here and a number of stoves, moulded at that time, are still in use in the county. The varieties of ore found are red fossiliferous, red shale, brown hematite and shaly brown hematite. The red fossiliferous, the most important of these ores, is found in five veins, one 52, one 30, one 27 inches in

thickness, the other two smaller. One of these veins, the larger one, has been followed for 45 miles, the entire length of the county, from Hardy until it dips under the Highland, Va., county line. The two other large veins were followed, the one for 8, the other for 3 miles, and both went under the limestone within sight of the Virginia line. This red fossiliferous ore, which analyzes about 55 per cent metallic iron, is found in Pennsylvania in very small veins and is what has made that State so great a producer of iron. It is seen again here in West Virginia, and then disappears to crop out again at Birmingham, Ala., where the same kind of ore that is found here has made that city the most famous iron producing center in the south. The Alabama ore is not nearly so rich in iron as this, nor is that in Pennsylvania so thick. Properly developed, this iron should make Pendleton county as prosperous and prominent in iron circles as is either of the regions mentioned. Besides the red fossiliferous ores, a brown hematite, just as rich in metallic iron, is found between the North Fork and the South Fork mountains for the entire length of the county. The average thickness of the vein is 16 feet. In addition to these two very valuable deposits of ore, there are also some other ores found in various parts of the county which are of less value and not so wide spread in extent.

MANGANESE.—For a distance of about ten miles along the same valley in which the iron ores are found, there is a very rich vein of manganese, very low in phosphorus. It is easily worked, and the deposit should prove to be of great value.

STONE, SAND AND CLAY.—Very fine limestone is scattered in great abundance throughout the county and for fluxing ores might be obtained from the same property from which the ore was obtained. Only the coal or coke would have to be brought into the county to produce iron from the native ores. Limestone for building purposes is also plentiful. There is also found a considerable amount of crystallized limestone, from which a superior quality of lime may be burned.

Glass sandstone, from which a pure, white glass sand is crushed, is found in the county in several places and to a considerable extent. It is about the same as that found in Morgan county.

Some fire and potter's clay have been found in the county and

small samples of them have been successfully worked. There are thought to be great quantities of them in the county.

TIMBER.—Aside from what has been removed to make a little land available for farming purposes, the timber is practically all standing yet. Probably four-fifths of the county is still in timber, which is very fine and embraces many different varieties. The principal wood is oak, the different varieties of which compose the larger part of the forests. Other kinds are chestnut, maple, hickory, some walnut and a little pine. There is but a comparatively small portion of the county that is covered with pine, and that has been pretty well killed by the pine destroying insect, but the other kinds of timber mentioned abound in every part of the county. The South Branch and its forks are not navigable, but in times of high water they may be used for drifting logs to market and afford the only means of transportation at present available for getting them out. There is an almost inexhaustible quantity of tanbark in the county. Thousands of acres are covered with tanbark-producing oak trees and there is enough tanbark alone standing in the forests of Pendleton county to pay the entire cost of constructing a railroad from one end of the county to the other.

AGRICULTURAL.—With so great a part of the county still covered with forests there has been but little opportunity for farming to any extent in Pendleton county. But when the county is once opened up and the immense quantity of timber that covers its hills and valleys is taken out, this county will certainly come to be a great grazing and stock raising one. Already a good many cattle are raised, and this is the chief line on which farming is carried on in the county. Some grain is grown but hardly more than is consumed at home, principally in fattening the cattle. The valleys of the streams that flow through the county are fertile and in some places broad. Here farming is successfully carried on. But a great part of the county is unfitted for cultivation On every part of it, however, grass will grow well and naturally, and stock raising will come to be more and more the principal line of farming. Sheep are raised to a considerable extent and are profitable. So are horses and hogs. In short, all kinds of live stock do well, the county being specially suited to them. It is is also a fi e country for fruit.

POCAHONTAS COUNTY.

LOCATION AND CHARACTER.—Pocahontas is an eastern border county, the top of the Alleghanies being the dividing line between Pocahontas and the State of Virginia. It lies about southeast of the center of the State. The northern portion of the county is a part of that high region in which the waters of nearly every river of the two Virginias find their starting points. The entire county has a great elevation, some of the highest points in the State being within the county lines. Three knobs ranging from 3,300 to 3,800 feet are in Pocahontas county or partially so. Rising in the high lands in the northern part of the county and flowing through the central portion of it the entire length is the Greenbrier river. In the western part of the county is the Williams river, which empties into the Gauley in Webster county. In general character Pocahontas is very similar to Greenbrier county, which joins it on the south. The east is mountainous, well timbered and full of iron; the center is limestone land, well cleared, with plenty of grass and nearly all cultivated or in grass; in the west are more mountains, much timber and some coal. The western portion, along with that of Greenbrier, is in the "Wilderness" region, which, as its name indicates, is an unbroken wilderness. The level parts of the county, smaller in extent than those of Greenbrier, are elevated plateaus from 2,000 to 2,500 feet above the sea, above which on all sides rise mountains, at least two ranges of which may nearly always be seen, one beyond the other, and the rivers are in deep gorges cut down far below the level of the plateaus. Throughout the county there is an abundance of pure, fresh water, some of which comes from the earth, even in the midst of summer, at a temperature little above that of ice water. The entire county seems to be underlaid with water and from the earth and mountain sides flow great springs, large enough to run a water mill. At one place the town is called Mill Point on account of the number of flour mills there, each run by its own particular spring of never ceasing water. Great streams which start thus from a hillside frequently disappear entirely, only to suddenly appear again from some unexpected opening in the earth. In some parts of the county wild game is plenteous. The county affords the most beautiful mountain scenery

imaginable, has pure air and water and for the summer months particularly no more delightful place could be found to live in. Marlinton, the county seat, is 45 miles over an excellent turpike from the Chesapeake and Ohio railroad. It is some closer to the West Virginia & Pittsburg, but the latter is not so accessible. The extension of it through the county is contemplated but has never gone further than the survey. By the C. & O. Marlinton is 176 miles from Charleston, 387 from Cincinnati, 283 from Richmond, 441 from Wheeling and 692 from Chicago.

COAL.—Little is known of the coals of Pocahontas, no developments ever having been made. Some investigations have been made but no coal has ever been mined for use either at home or abroad. A large area in the western part of the county is underlaid with the New River seam of coking coals, in veins of 2 feet and upwards, reaching in one instance, it is said, a thickness of 18 feet. The coal has been tested and proven equal to the best New river coking coal, which has given to the New river region in Fayette county and the Mercer and McDowell fields further south their fame as coke producing regions. This coal is about the closest coking coal known to the iron producing region of Virginia and West Virginia, and railroad transportation and the development of the coal is all that is needed to create a great demand for it.

IRON.—The entire portion of the county lying east of the Greenbrier river is full of iron ores, from one end of the county to the other. The ores found are principally the brown hematite and red fossiliferous, the latter not being found in very thick veins or over a great extent. Of the brown hematites, though, there is an almost inexhaustible supply. They are found in large veins, over great areas and of excellent quality. The ores are of the same character as those from Monroe and Greenbrier counties, and are found in continuations of the same veins that they are found in.

MARBLE AND LIMESTONE.—For building purposes there are some beautiful specimens of blue, grey and fossil limestone in this county, the latter, in particular, very pretty. There is also a beautiful grey sandstone, valuable for building purposes. Limestone for burning and fluxing is found in abundance and close to the iron deposits. In the southeastern part of the county, near the Greenbrier line, some very pretty black marble is found, and in the same mountains

a large ledge of the most beautiful white marble has been discovered. While only in a few places has marble been found, it is believed that the mountains contain a great deal of it and that the samples so far seen are but specimens of what will later be discovered. The black and white marbles so far found are beautiful specimens and very valuable.

TIMBER.—From a half to two-thirds of Pocahontas county is still covered with timber, and no greater variety or finer timber grows in any county in the State. In the eastern portion of the county, in the high altitudes of the Alleghany mountains, grows one of the largest areas of white pine in the State. The amount of white pine in Pocahontas and Greenbrier counties has been estimated at 600,000,000 feet, and of this the greater part is in Pocahontas. Large inroads have been made in this timber in the last few years, but there is yet an enormous quantity standing. The logs are hauled to the Greenbrier river where they are rafted and taken out on the spring rises in rafts of thousands of logs at a time. Lumber camps where hundreds of men are housed and fed are scattered through the mountains in the east of the county, but there is an abundance of timber left. In the high altitudes of the western part of the county grow great forests of the "yew pine" or black spruce and cherry. These forests are principally in the "wilderness" country and have never been touched. Besides these valuable kinds of timber, which are not found in many of the counties of the State, and not in very great quantities in any, there is also an abundance of timber of the commoner kinds. The oaks are found in greater quantities than any other kind, followed by poplar, chestnut and the common forest trees in great abundance. The value of the standing timber of all kinds in Pocahontas is estimated at over $2,000,000.

AGRICULTURAL.—East of the Greenbrier river the soil is not so well adapted to farming as it is west of the river, where its fertility is seldom surpassed. Even to the tops of the mountains in the western portion the soil is good and grains, fruits and grasses all grow well. Many of the mountain sides are not too steep to cultivate and on these are grown good crops and fine pastures. All the cereals produce large yields and wheat and corn are raised in abundance. Many mills are required in the county to grind the pro-

ducts of the farms for home consumption. The soil and climate are well suited for tobacco culture and for fruits. The former is not cultivated to any considerable extent but there is a great deal of fine fruit raised. In the limestone soil blue grass grows spontaneously and over a large part of the county may be found blue grass sods of as luxuriant growth as can be found in the sown fields of Kentucky. "Timothy, clover and numerous other choice varieties contest the right of the blue grass to the field; so we find them growing together, each trying to choke out the others and to climb high enough to hide all the rest." This blue-grass-producing soil is in the greater part of the county and there is but a small part of the county where grasses do not flourish. Consequently a great many cattle and sheep are raised. Pocahontas cattle are as fine and as marketable as those raised in any part of the State. Sheep are raised in large numbers and command as high prices as any on the market. Buyers from other States come to this county after them and do not wait for them to be sent to market. Splendid blooded horses are raised and few counties can show finer live stock of any kind than can and does Pocahontas When the remaining half or more of the county is cleared the opportunities for farming and stock raising will be greatly enlarged and Pocahontas will then rank well up with any part of the country in that line.

PRESTON COUNTY.

LOCATION AND CHARACTER—Preston county is in the northern part of the State, about midway between the two panhandles. On its north is the State of Pennsylvania and its eastern boundary is the western boundary of the State of Maryland. From the south to the north and northwest, dividing the county into two almost equal parts, flows the Cheat river which empties into the Monongahela just below the Pennsylvania line. It is not navigable. The Baltimore & Ohio railroad passes through the county from east to west slightly south of the centre, and from Tunnelton, a station on this road, the Tunnelton, Kingwood & Fairchance narrow gauge railroad runs to Kingwood, the county seat, a distance of 11 miles. The distance from Kingwood to Martinsburg is 171 miles, to Baltimore 285, to Wheeling 131, to Parkersburg 135, to Charleston 269, to Cincinnati 330, to Chicago 598 miles. Through the county the

Briery mountains extend from south-west to north-east and at Rowlesburg the Cheat river breaks through them, forming some of the grandest and most picturesque scenery to be found in the State. Principally mountainous, the county is all high, the elevations of the B. & O. railroad from west to east in this county ranging from 1,157 to 2,550 feet above sea level. Above these elevations rise the mountain ranges. This high country is not much broken, being hilly and level over a large part of the county. Some of the mountain portions of the county are too rough for agricultural purposes but the greater part of it is well suited for grazing and farming. The climate is delightful, the air in summer being cool and fresh, by reason of the altitude, and attracting every summer hundreds of visitors.

COAL.—Every part of Preston county is supplied with coal, the part west of the river in more abundance than the rest. The workable veins are five in number ranging from 3 to 12 feet in thickness. Veins of coal are worked in every part of the county for local use and in five places for market. The principal coals found belong to the Upper Freeport and Lower Kittanning measures and are of excellent quality. All the coal is good gas, steam and coking coal and at every mine in the county coke is made. The coke from these ovens has become quite well known in the markets and holds an excellent reputation. There are large fields of the same kind of coals from which this is produced, in all parts of the county, awaiting development. The coal is all in workable veins above water level and may be easily mined. There is also some cannel coal in the county, but it has never been worked. It is said to reach a thickness of several feet. From the reports of the State Mine Inspectors it is seen that the coal output of Preston county for the year ending June 30, 1891, was 134,467 tons, and of coke 60,541 tons. There were 255 ovens in blast and 50 more building. For the year ending June 30, 1892, the output of coal was 82,089 tons, of coke 19,773 tons. The number of coke ovens in blast was 139.

IRON.—Iron ore in paying quantities is found in every part of the county, and numerous furnaces have at different times been in operation, but most of them, for want of transportation facilities have had to be abandoned. One located near the B. &. O. railroad, and connected with it by a short standard gauge road, has done well,

and though shut down for some time, the news has recently come that work is to be commenced again in the spring. The veins of ore which have been opened in every portion of the county range in thickness from a few inches up to 10 feet, most of them being between 3 and 10 feet. The ore yields from 35 to 50 per cent. of metallic iron and some of the ores are of limestone character so that other ores more siliceous may be worked with them without the addition of limestone. For the ores that require fluxing the limestone is found upon the same property that produces the ore and coal. The ore, coal and limestone are found and the coke made upon the furnace property, without going away from it for anything required to make iron. Ores have also been mined and shipped to furnaces outside the State, where they have been successfully worked. There are numerous places in the county where the iron has never been touched and which will undoubtedly yield well when developed

LIMESTONE.—Near Rowlesburg, along the railroad, a vein of remarkbly pure limestone has been found, which is about as fine a quality as is ever seen. The vein is about 2 feet thick and has been traced for 10 miles. How much farther it goes is not known. The stone is 99.8 per cent. calcium and when burned to make lime leaves almost no waste at all. It makes a superior quality of hydraulic cement and the only reason it has not been utilized for this purpose is that no company has yet been willing to pay the salary demanded by the few men in this country who understand the manufacture of hydraulic cement. It has been tested, though, and makes a very superior article of cement. There is also an abundance of fine limestone for building purposes, in ledges as high as a hundred feet thick, in nearly every part of the county. Some sandstone of excellent color and quality for building purposes is found.

GLASS SAND—A sandstone that is very white and pure is found in large quantities, suitable for glass sand but has never been quarried to any extent. It might profitably be crushed and shipped, or glass works operated here would doubtless prove profitable.

FIRE CLAY.—Shafts and railroad cuts have demonstrated the great extent of the fire clays of Preston county and actual tests have proven their value. At one place in the county a shaft sunk into the earth passed through 44 feet of good fire clay. At other

places veins of several feet in thickness have been cut into by railroads or in other digging. These clays are equal to the well known Mt. Savage clays. None of them have ever been worked but being of good quality and existing in large and accessible beds the manufacture of brick and tiling might be made a profitable business. Potter's clay is also found in considerable quantities.

OIL AND GAS.– Some years ago some borings were made for oil but no great depth was reached and no oil was found. Since then there have been no more borings, but there is a constant issue of natural gas from a creek in the western part of the county and the supposition is that there is both gas and oil in the county in good quantities.

TIMBER.—Probably three-fifths of Preston county is still covered with timber, of which the principal kinds are the different varieties of oak. The oak of Preston county is particularly fine and many English buyers come direct to Preston county to buy oak on account of the superior quality of the timber It is very close grained and hard and commands the highest market price. There are some tracts of hemlock and spruce but the principal woods beside the oaks are poplar, chestnut, hickory, ash, walnut, cherry, linden and other varieties. The Cheat and its tributaries afford ample means of getting timber out and there is plenty of fuel for wood manufacturing enterprises. There are thousands of dollars represented in the standing forests of Preston county which await the cutting to reward the men who cut them.

AGRICULTURAL.—Only a small part of the county is unfit for farming purposes. Most of the mountain tops are level and many of them are not so steep that they may not be cultivated entirely to the tops. The soil of the county varies considerably but most of it is rich and several inches deep. The principal crop raised is buckwheat. Corn, oats and some other grains are raised, but Preston pays more attention to buckwheat than to any other crop and the yield is greater than that of any other. The soil and climate are well suited to tobacco and considerable of that is grown. But it is chiefly as a grazing county that Preston is known. Cattle and all kinds of live stock are raised to a great extent. The soil produces splendid crops of timothy and clover and pasturage affords all the feeding that is required for cattle and sheep. The abund-

ance of good pasture, pure water and good air causes the production of the best of beef and mutton. Good horses are also bred. The sheep raising industry is carried on to such an extent that woolen mills have been constructed to manufacture the wool at home. The wool is of very good quality. Fruit raising is an important branch of agriculture and no better fruit country can be found anywhere. Apples, grapes, pears and all kinds of small fruits of excellent quality are produced.

PUTNAM COUNTY.

LOCATION AND CHARACTER.—Putnam county lies slightly to the northeast of the westernmost point in the State, not far from the Ohio river. Flowing in a northwesterly direction and dividing the county into almost equal parts is the Great Kanawha river, navigable for large steamers for a hundred miles from its mouth. In the eastern part of the county for a short distance is the Pocataligo river, which empties into the Kanawha. Other smaller streams water the county, those in the northern portion flowing into the Kanawha, in the southern into the Guyandotte. The county is principally hilly with broad bottom lands and much rolling land back from the rivers. In the northern part of the county the hills have become mountainous but are nowhere much broken. The Kanawha river, improved by the United States with locks and dams, affords slack water navigation and when the works now under contract are completed steamboat navigation will be afforded every day in the year regardless of the stage of water. Following the Kanawha river for its entire length is the Kanawha & Michigan railway connecting the Kanawha valley with Columbus, O., and the great lakes at Toledo. Through the southern part of the county from east to west is the Chesapeake & Ohio railroad, connecting Louisville and Cincinnati with the seaboard. From Winfield, the county seat, to Charleston is 25 miles, to Toledo 284, to Parkersburg 110, to Wheeling 204, to Richmond 395, to Cincinnati 210, to Chicago 515 miles.

COAL.—The Pittsburg vein of coal, known locally as the Raymond City vein, underlies the entire county and has been mined for many years along the banks of the Kanawha. The coal is a hard splint, unexcelled for shipping, gas, steam and fuel. In the entire north-eastern part of the county this coal is found above

water level in a vein averaging 6 feet in thickness. The coal is a very valuable one and holds a very high position in the markets of Cincinnati, Chicago and the west generally. South of the Kanawha the same coal is lower and has been found in boring for oil five miles from the river at a depth of 180 feet. This is near the southern limit of this Pittsburg coal, the last being found in Wayne, where it runs out just before reaching the Kentucky line. There is above this vein another one, several unsuccessful attempts to develope which have been made and its value is not yet determined. The Raymond coal is mined to a considerable extent and shipped by river and rail. The reports of the State Mine Inspectors show that for the year ending June 30, 1891, there were four mines operated in Putnam county, employing in all 424 men and producing annually 156,856 tons of coal. For the year ending June 30, 1892, the same mines employing 503 men produced 154,692 tons of coal.

OIL.—Oil has been bored for on several different occasions in Putnam county and none has been found, still the territory has never been properly developed. In Jackson county near the Putnam county line a well was bored which flowed several barrels a day but it was cased off to bore to a deeper sand when the well was abandoned unfinished. In Putnam indications of oil have been found but none of the wells hitherto bored have been carried down to the best oil sand. They have been abandoned before reaching the best sand. It is very probable that further development will be carried on this year and it will be ascertained definitely whether there is any oil in Putnam or not. Natural gas has been found in several places in the county.

FIRE CLAY—Good fire clay in large deposits has been found in Putnam. A thick bed of clay near the county seat was opened and the samples sent for analysis and practical tests of its usefulness showed it to be equal to the best found in the State. Beneath the coal vein is a smaller vein of good fire clay. No developments of the clay have ever been made.

TIMBER.—Easily accessible by river and rail Putnam has been stripped of most of its timber. Magnificent oak timber grew here in great plenty and there is some left yet, as fine as is often seen, but the greater part is gone, not over an eighth of the county re-

maining in good timber. A considerably larger part of the county is covered with woods, some of which are suitable for staves and other small timber but not for saw timber. Tanbark may be found in abundance and there is a great deal of good hickory, some poplar, a little pine and other kinds of timber. South of the Kanawha more of the timber has been removed than north of it where there is a good deal left but this has begun to be cut.

AGRICULTURAL.—Farming is the principal occupation of the people of Putnam. The hills, when cleared of their timber, make excellent pasture lands, the grass grows well and cattle flourish. The broad Kanawha river bottoms make splendid farms Broad, level, rich and productive they make the finest kind of farms and produce magnificent crops. Corn and wheat are the chief crops now raised. The land is well adapted to garden stuffs, and the railroads and rivers put them in easy reach of markets. The hill lands are well adapted to tobacco, and some very fine light leaves are raised. Putnam stands along with Lincoln as a tobacco growing county, producing, perhaps not so much, but just as fine a quality of tobacco as does Lincoln. Across the county from the Kanawha to the waters of Mud and Guyandotte rivers is the fertile Teays' valley, through which the C. & O. railroad takes its course, and which is supposed at one time to have been the course of the Kanawha river, which then would have joined the Ohio at what is now Huntington. This valley is low and level. It is fertile throughout and enclosed between rich, rolling lands or hills. This and the Kanawha bottom lands are the best in the county for farms.

RALEIGH COUNTY.

LOCATION AND CHARACTER.—Midway of the State from east to west and but little north of the most southern point is Raleigh county. The county is principally mountainous, the Guyandotte mountains on the south being among the highest mountains in the State. Their height is estimated at 4,000 feet. Several mountain ranges pass through or outline the county. But most of them are the Flat Top mountains and while the elevation of the county is high it is not broken and the surface is principally level or rolling, with only occasional ranges rising above the general level. The streams are cut deep down in the earth and the most broken parts of the county

are their steep sides which broaden out at the top into great plateaus. Along the northeastern boundary for a short distance flows the New river, separating this county from Fayette and Summers. In the eastern portion the streams flow northward and empty into New river. Piney and Glade creeks are the principal waters in this part of the county. In the western part rising near the center of the county and flowing in a northwest direction is Big Coal river, small of course in this county. Along this river are the "Coal River Marshes," a section of high, level, marshy country, similar to the "glades" of Webster county. Along Glade creek some of the same kind of land is seen The glades are too wet to be of value for agricultural purposes. Drainage and cultivation might make splendid land of them but at present they are not considered valuable. Along the northern bank of New river, just outside the county, for over 20 miles, runs the Chesapeake & Ohio railroad. From Raleigh Court House to the nearest railroad point is 12 miles, to Charleston 86, to Richmond 307, to Wheeling 351, to Cincinnati 297, to Chicago 602. The county is in a primitive condition, the greater part of it at least, and awaits development. It will some day be one of the best counties in many respects in the State.

COAL.—The county is practically covered with coal. It is the Flat Top coking coal and the measures are about 1,800 feet thick. There are several veins in the measures but only three are workable. One is 6, one 5 and one 4 feet thick and the others are smaller. Tests have been made over some eighty square miles and show every where the same veins. Along the line of Summers and Mercer counties they disappear over the mountain tops, while in the western part of the county they disappear under the Fayette county line and a new series, the Kanawha coals, come in. But little of the Raleigh coal has ever been mined for market but there is a tremendous amount stowed away in the earth in workable veins, which will be mined and marketed in time. Opposite Prince station on the C. & O. railroad one mine, the only one in Raleigh county, is operated. Coal mined far up the mountain side and on the opposite side of the river from the railroad is swung across to the cars in buckets, holding half a ton apiece, which are carried over on an endless rope and the coal is lifted and swung from the mine down the hill and across the river and there dumped into the

railroad car all at one operation. Thirty-two buckets are used with a carrying capacity of about 400 tons a day. The coals of this county are all good coking coals as well as suitable for gas and steam.

TIMBER.—As much as seven eighths of the county is still in original forests. Not until within a few years has any timbering been done and never has there been but little. The products of the farms do not quite support the people and the difference is made up by dealing in timber. Poplar and oak are the principal woods in the forests of Raleigh county. The county is in the finest timber country in the State and some of it is very good. The high, rich lands have produced splendid trees which make beautiful logs and abundant timber. The poplars are large and the oaks are too. Difficulty of access is all that has kept this timber from being utilized before. Along Piney creek and between that and Glade creek are some thirty or forty thousand acres of white pine, in all perhaps a hundred million feet. This is being cut a little but nearly all of it still remains.

AGRICULTURAL.—The high, level sections of the county which compose the greater part of it are good for farming and grazing purposes, particularly the latter. Very little farming has ever been done in the county but those who have farmed are prosperous and their farms produce well. Corn is the principal product aside from grass, which is abundant. Tobacco grows well in some parts and the whole county is well adapted to its culture. For fruits the county is unexcelled, and some fine varieties are grown. Grass grows well and the county is an excellent one for cattle and sheep.

RANDOLPH COUNTY.

LOCATION AND CHARACTER.—The largest county in the State, lies between the eastern boundary of the State and the center. With a territory larger than that of several of the States of the Union, and almost every variety of soil and climate and natural productions, Randolph offers a wide field for the person seeking a location or place of investment. The county is just to the west of the main Alleghany range of mountains and lies principally among the numerous smaller ranges that lie immediately to the west of and parallel to the Alleghanies. The region is the highest in the State, all

the rivers in the State having their sources in or near the county. Half a dozen mountain ranges run parallel through the county, and between them are as many streams, uniting below to form the Cheat and Valley rivers which flow into the Monongahela and help to form the great Ohio river. The eastern or mountainous portion of the county has an average elevation of about 3,000 feet, while the western part, though high, is much lower. Through the center of the county passes the valley drained by the Tygart's Valley river. This is the best part of the county agriculturally and the least rugged. The valley is some 40 miles in length and averages a mile in width. The soil is fertile, the land level, surrounded by mountains, the climate good and the scenery beautiful. None of the streams that pass through the county are large enough to be navigable for boats of any kind, are besides too swift and have too much fall to make them useful, except for taking out timber, for which purpose they afford splendid facilities. The county, though settled back in the latter part of the last century, has remained so inaccessible that few people have settled within its borders. The families of the earliest settlers still remain in some parts of the county, property first taken up by them having descended from father to son for many years. The difficulty of making good roads over the many mountain ranges, and the distance of the county from railroad connections have kept it in a wild and unsettled condition except for the Tygart's Valley region, which has been pretty well settled and is prosperous. Recently the West Virginia Central and Pittsburg railroad has been built into the county and has been the means of improving and building it up a good deal already. The road comes from the northern part of the State where it has connection with the Baltimore and Ohio railroad and the roads in Maryland, passes southward about half way through the county and then turning west connects with a branch of the B. & O. in Barbour county. A branch also extends from Elkins, where the road turns west, to Beverly, the county seat, 7 miles south of Elkins. By this road the distance from Beverley to Martinsburg is 207 miles, to Baltimore 307, to Wheeling 167, to Parkersburg 171, to Charleston 306, to Cincinnati 360 and to Chicago 627 miles.

COAL.—The western portion of the county is full of good coal, belonging to the "Lower" measures. The same coal that is found

in Grant and Tucker counties, along the lower part of the West Virginia Central road, are also found in this county. The coal is an excellent coking coal and the coke made along the line of this road is equal to the best made in the State. The eastern part of the county, among the mountains, possesses no coal, but in the western part is the "Roaring Creek" vein, which is known to be 22 feet in thickness and is said by some to be even thicker. No developments have ever been made of the coal in this county. The value of it is known and the fact that there is a great deal of it in veins of tremendous size, but the inaccessibility has hitherto prevented the mining of the coal, but since the railroads have been built into the vicinity of the coal lands, plans are on foot for the development of the property, and soon a good deal of coal will be carried out of Randolph county over the W. Va. C. & P. railroad. The coal is an excellent coking coal, good also for steam, gas and fuel and the tremendous quantities of the coal make the lands on which it is to be found extremely valuable.

CLAY.—Good fire clay is found in the county in considerable quantities, but none of it has ever been worked. Some ochre has been found but this has never been developed either, and its extent is not known, nor its value.

TIMBER.—Probably the largest area of timber in any one county of the State is standing in the county of Randolph. On account of the excellent quality of the timber, the vast quantities of it and the ease with which it may be gotten to market, there has been a great deal of it taken out, but there is still standing over hundreds of square miles of the county the finest of timber untouched by the woodsman. In the higher parts of the county the pines, hemlock and cherry grow in great quantities. The oaks and maple, beech, ash, poplar and other varieties of valuable timber are found throughout the county. Large forces of men are at work in the mountains of Randolph, clearing the forests of their timber, but with the immense territory in the county which is still covered with timber, the amount taken out is scarcely missed, so much more is left. Though settled for over a hundred years, fully half the county is still in the original forest. Many rare varieties of timber are found in Randolph county, but the kinds mentioned above are the principal ones in the county.

AGRICULTURAL.—Broken as is the eastern part of the county with mountain ranges, it is scarcely suited for farming purposes. The timber taken off, though, the hills afford good pasture land and grass grows in profusion. In the western part of the county, particularly in the valley of the Tygarts Valley river, there is some of the finest farming land in the State. The bottoms are broad and fertile and produce enormous yields of corn and other crops. Many of the hills of the county are not so steep but that they may easily be cultivated and on them such crops as require a high elevation and cool climate grow well. At the head of Valley river, is a particularly fine portion of the county, known as the Mingo Flats. The land in this vicinity is very fertile, the surroundings and climate all that could be desired to make a pleasant dwelling place and some of the best people of the county reside there.

GAME.—The great portion of the county which is still in the original state is filled with game of all kinds and in the mountains, far from the railroad or settlements of any kind, a sportsman's club has built a handsome club house. A large game preserve has been purchased and members of the club who care to spend a portion of every year in the mountains seeking rest and recreation come here and hunt and fish to their hearts' content. Game of all kinds, deer, bear and the smaller animals are plentiful and trout are caught by the hundred.

RITCHIE COUNTY.

LOCATION AND CHARACTER.—Ritchie county is north-west of the center of the State, slightly east of the western boundary. Through the county flow both the North and the South Fork of Hughes' river, a tributary of the Little Kanawha. These streams, with the waters that flow into them, water the county well. The county is hilly, some of them quite high, but not steep, and the general character is that of a rolling county, with gently sloping hills, suitable for cultivation to their tops. Through the county from east to west, a distance of some forty miles, runs the Baltimore and Ohio railroad. Harrisville, the county seat, is nine miles off this railroad, with which it is connected by the Pennsboro & Harrisville narrow gauge railroad. The distance from Harrisville to Parkersburg is 51 miles, to Martinsburg 251, to Baltimore 365, to Charleston

185, to Wheeling 145, to Cincinnati 246, to Chicago 612. The county is traversed by numerous good roads and the Cairo and Little Kanawha Valley narrow gauge railroad extends from Cairo, on the B. & O., for a distance of 16 miles toward the Little Kanawha valley, which is the point it expects to reach some day.

COAL.—In nearly every part of the county coal is found, but only in small veins, very few of which are large enough to be worked. The thickest of them are about three feet in thickness, and no coal has ever been mined in the county save for local use. These are the surface coals. Underneath the surface there is an abundance of good coal. In boring for oil a 7 foot vein of good soft coal was found at a depth of 150 feet, and an 11 foot vein at a depth of 200 feet. These are the Pittsburg coals, good for steam, gas and coking, and their existence under the entire county in such thicknesses means an enormous amount of coal in the county, available with little difficulty. In England coal shafts are made a thousand feet deep and other shafts are made hundreds of feet in depth, so that a shaft of from 150 to 200 feet would be a small matter when from 15 to 20 feet of the best kind of coal is to be secured. An enormous amount of coal will certainly be produced in Ritchie county.

OIL AND GAS.—At different times more than a thousand wells have been bored for oil in Ritchie county, and never more than a very few—a dozen at most—have been entirely dry. During the early oil excitement, back in the sixties and seventies, there was a great deal of oil produced. At that time the shallow wells were productive. Later, wells have been sunk as far as the "Big Injun" sand, and considerable oil has been produced from this. But no wells have been sunk as deep as the Gordon sand, the most productive sand yet struck. About a half of the rich and productive oil field lying along the Wood and Ritchie county line, known as the Volcano field, is in Ritchie, though usually credited to Wood because Volcano, the town from which it is named, is in Wood county. Natural gas is abundant, the county seat is lighted and heated with it and it may be obtained in enormous quantities.

FIRE CLAY.—A vein of excellent fire clay, about 18 inches thick, is found over a large area near the county seat. Samples of it have been tested, and it is proven to be of good quality for making brick, tiling, etc. There is probably clay in other parts of the county.

MARBLE.—A fine vein of marble, about 5 feet thick has been found, which seems to be of superior quality. It is brown, colored with gray, dark and bright colors of many shades. The vein has never been found except in one small locality. It is fine grained and takes an excellent polish.

TIMBER.—Probably a third of the timber of the county is still standing. The poplar is more nearly exhausted than any other kind of timber and not much over an eighth of the poplar is left. The other timbers are principally oaks, with some walnut, ash, chestnut, maple, birch, beech and a little pine. This timber is all of excellent quality and is being rapidly removed. In the south-eastern part of the county is where the greater part now stands.

AGRICULTURAL.—The soil of Ritchie county is very rich and well suited to all agricultural purposes. Red clay soils predominate on the hills, a rich black loam in the bottoms. The entire county is well watered by the numerous streams that flow through it. Grains and grasses grow in great quantities. Grains are raised in the lower lands and yield well. Corn is the principal crop. Some wheat is raised and fruit is abundant. The hills and higher ground are admirably adapted to fruits and much fruit is raised. On the hills, and in the valleys too, grass grows luxuriantly. Much attention is given to stock raising. Cattle, sheep and horses are raised. The pasture of this county is unsurpassed and lasts the greater part of the year, and stock of all kinds does well. Numbers of cattle and sheep are grown and special attention is being paid to horse breeding. Clydesdale and Norman draft horses and some racers are bred. The grazing interests are the principal ones of the county.

ROANE COUNTY.

LOCATION AND CHARACTER.—Roane county lies midway between the center of the State and its western boundary. Its surface is hilly and rolling, not mountainous nor high, save in the southern portion, where the hills attain some height, and is undiversified in character. It has no mountains and no streams of any size. In the northern part of the county the waters flow northward, and into the Little Kanawha river. In the south they flow southward toward the Elk and Great Kanawha rivers. In the southern part the headwaters of Poca river are large enough to float out logs on when

there is a rise. From the northwest the Ravenswood, Spencer and Glenville railroad extends into the county as far as Spencer, the county seat, connecting that town with the Ohio river and the Ohio River railroad at Ravenswood. This distance is 33 miles, and makes the distance from Spencer to Parkersburg 68 miles, to Huntington 119, to Charleston 135, to Wheeling 162, to Baltimore 466, to Cincinnati 280, to Chicago 585.

COAL.—No coal has ever been mined in Roane county, except for local use, though it is found over all the county above water level. In most of the county the veins are small, not exceeding 2 or 3 feet, but in the southeastern part of the county they run up to 8 or 10 feet in thickness. These veins are of the Pittsburg coking coals, which extend into the county from the Clay county field. The coal makes excellent coke, is easily mined and might, with proper means of transportation, become a source of great revenue to the county.

TIMBER.—About half the county is still well covered with timber. A large part of the poplar timber has been removed, but other timber remains over a greater part of the county, nearly all the oak is still standing and in the southern part of the county no timber at all has been taken off. The timber of Roane is very fine, and commands first class prices in all the markets where it is found. The principal varieties found in the county are oak, poplar, ash, walnut sycamore, maple, beech, pine, chestnut and hickory. Some other varieties are found in greater or smaller quantities. There is a great deal of timber suitable for ties, and the streams that are not large enough for logs will carry out ties. There are also vast quantities of tanbark in the county.

OIL.— It is thought. upon the basis of surveys and calculations made, that Roane county lies in the Little Kanawha oil field, but no search has ever been made for oil and there is not known to be any in the county.

IRON.—Iron ores exist in small quantities in this county but no attempts have ever been made to ascertain their value. There is also some limestone, found along with the iron.

STONE.—There are large ledges of valuable building sandstone. A beautiful grey sandstone, which is easily worked, susceptible of a high polish and durable, is found in inexhaustible quantities and

has been used to some extent in the county. A good deal of this stone was used in the construction of the buildings for the Second Hospital for the Insane at Spencer. Clay for the manufacture of building brick is found in abundance and the brick made from it are pronounced by experienced workmen to be of very fine quality.

AGRICULTURAL.—The soil of Roane county in every portion is good, and its rolling character, with broad valleys and gently sloping hills, affords available farm property in about the entire county. The northern and western portions are those in which farming is most extensively carried on at present, the other parts being more in timber. Corn and wheat are grown, principally in the bottom lands, the corn yielding better and being the principal crop. The county is particularly adapted to grazing. Blue grass grows spontaneously in the uplands and covers the hills with magnificent pasturage. In the lower parts timothy grows very heavy and makes excellent hay and a great deal of it. Clover grows well in all parts of the county. Naturally, where so much pasturage exists, cattle thrive and many of them are raised, as many, it is said, as in any other county in West Virginia. Very fine stock is grown and this is the principal occupation of the people. Sheep are also raised in great numbers and prove very profitable. Hogs receive their share of attention and much good pork goes out of Roane every winter. Good fruit is raised in all parts of the county, the hills being well suited to its culture. Fruits, poultry, butter and eggs, live stock and the timber products are the principal sources of revenue to the county and are all sent out in considerable quantities.

SUMMERS COUNTY.

LOCATION AND CHARACTER.—Summers is one of the most southern counties in the State. It is south of the center, north-east of the southernmost point, and not far from the south-eastern boundary, the southern point barely touching the boundary of Virginia. Through the centre of the county from east to west flows the Greenbrier river, along the bank of which runs the Chesapeake and Ohio railroad. From the south the New river enters the county, uniting with the Greenbrier at Hinton, on the western border. From the south-west the Bluestone river enters the county and empties into the New river above Hinton. None of these rivers is navigable. At

one time a steamboat was built for the New river trade above Hinton and it was run for a short time, but the water was found to be insufficient and the boat was abandoned. The Chesapeake and Ohio railroad is now the only means of communication which the county has with the rest of the world, and by this the distances from Hinton, the county seat, are: to Richmond 272 miles, to Charleston 97, to Parkersburg 232, to Wheeling 326, to Cincinnati 308, and to Chicago 613. The county is principally rough. The hills are high, and in places steep and rugged. The rivers cut deep into the bases of the hills and make the mountain sides along them steep and rough. Back from the rivers, though, the mountains flatten out and become much less rough, and in places spread out into good farming country.

COAL.—Summers is not a good coal county. Into the western portion the New River coal extends and in the southern part the Flat Top coal is found, but it is only in a small part of the county that any coal is found, and then only along the edges of fields that are worked elsewhere. However, there is good workable coal in the county, and the only trouble is that there is not enough of it.

IRON.—Iron ores are found scattered over nearly all the county, but no developments have ever been made, and the value or extent of them is unknown. Surface samples may be picked up almost anywhere and there are some apparently valuable samples too. Iron ore in Raleigh county analyzes 55 per cent. of metallic iron and the Summers county ore is probably very similar to this.

FIRE CLAY.—This and potter's clay are abundant in the county and of good quality. Among the beds of clay now known to exist have been found relics of prehistoric races—broken pottery, etc.—showing that before the discovery of America by Columbus, the value of these clays was known, and they were put to practical test in the making of utensils of every day use in the wigwam. And now, after a lapse of more than four hundred years, the clay is still here and our people, so many years behind these prehistoric races, are just beginning to learn of their value. The deposits are large and the clay excellent for all the purposes for which it may be used.

BUILDING STONE.—In that entire portion of the county north of the Greenbrier river and the New river below the mouth of the Greenbrier—about half the county—several seams of a most beau-

tiful brown sandstone are found. This is a splendid building stone of a beautiful color, and has already given the county a wide spread reputation. It is sent to all parts of the country from the several quarries that have already been opened up, and may be seen in some of the handsomest buildings in most of the larger cities. Some of the same stone is also found in the southern part of the county, but not so much as there is in the northern part. There is also a red stone, similar to the brown except in color, but there is not so much of it as of the brown. Large ledges of white and grey sandstone are also found. In the western part of the county is a very fine sandstone valuable especially for bridge piers and for work under water. It has been shipped largely for use on the Atlantic coast for piers, etc. It is a very tough, tenacious stone and long slabs of it will bend several inches before they will break. Almost every kind of stone except limestone may be found in Summers county.

TIMBER.—Fully two-thirds of the county has been stripped of its timber, but some very fine tracts still remain. The principal woods are oak, poplar, ash and other hard woods, including some walnut. In the southern or Flat Top region there is a little pine but not much as compared with the amount of other timber in the county. The timber can not be floated down the New river owing to the rapids and boulders in the river, but much is now being hauled to the railroad where it is sawed and shipped.

AGRICULTURAL.—While not particularly an agricultural county Summers is still well adapted to several varieties of agriculture. Some grain is grown though not enough is now raised in the county for home consumption, more being brought in than is taken out. Part of the county is rocky and mountainous but there is a large part of it that is well suited to farming. Most of the county is good grazing land, grass growing well all over it. Some cattle are raised and are profitable, though as a stock raising county Summers will not compare with Greenbrier and Monroe, the adjacent counties on the east. It is well adapted to sheep raising and although this industry is now almost neglected it would undoubtedly prove profitable. The southern part of the county has shown itself to be remarkably well adapted to the culture of tobacco and some very fine tobaccos are grown. All kinds of fruits do well in the county, particularly grapes, apples and berries. The high, flat mountain tops, fertile soil and cool climate are excellently adapted to fruit culture.

TAYLOR COUNTY.

LOCATION AND CHARACTER.—South of the Pennsylvania line, west of the Maryland line, and not over 30 miles from either, is Taylor, one of the smallest counties in the State. Flowing in a north-west direction, and dividing the county into almost equal parts, is the Tygart's Valley river which unites in the next county with the West Fork river to form the Monongahela. From Grafton, which is about the center of the county, the Baltimore and Ohio railroad runs in four directions, eastward to Baltimore and New York, westward to Parkersburg and Cincinnati, to the north-west to Wheeling, and southward through Barbour county to a connection with the West Virginia Central and Pittsburg railroad. Grafton, the county seat, is excellently situated with regard to transportation. The distance to Martinsburg is 180 miles, to Baltimore 294, to Wheeling 100, to Parkersburg 104, to Charleston 238, to Cincinnati 300, and to Chicago 567. On the east are the foot hills of the Laurel mountains, the roughest land in the county. Most of the land is rolling, with gently sloping hills except along the river, where they are steep. The county is well watered with the small streams which flow into the Valley river and the West Fork. The eastern half is more distinctively the mineral part, while the west is similar to Harrison, the grazing county on the west. Though small, Taylor county is favored with much natural wealth of various kinds.

COAL.—About the entire county is underlaid with the coal of the Lower measures, which in this county contain two workable beds, the Upper Freeport and the Lower Kittaning, which are both worked in the adjacent county of Preston, and are both excellent coking coals. The veins are from 3 to 6 feet thick in this county. In a portion of the county, the extent of which has not been definitely ascertained, but over at least 10,000 acres, the Pittsburg coking coal is found in a vein varying from 6 to 8 feet in thickness. In the western part of the county there is a 9 foot seam of gas coal of as fine quality as any in the State.

For the year ending June 30, 1891, the reports of the State Mine Inspectors show that there were in Taylor county two coal mines producing 83,851 tons of coal and 25 coke ovens producing 8,458 tons of coke. For the year ending June 30, 1892, the reports show

that the two mines produced 74,000 tons of coal and the 25 coke ovens 7,756 tons of coke.

IRON.—Iron ores in considerable quantities are found in various parts of the county and have been worked to some extent. As long ago as 75 years there was a furnace in Taylor county making iron and since that time others have been in operation, but there is none now. Iron ores, though, are abundant and are found throughout the eastern part of the county in veins of from 1 to 16 feet in thickness and showing, upon analysis, from 30 to 60 per cent. metallic iron. There is also some manganese but it is not found in very extensive quantities.

FIRE CLAY.—Over several thousand acres in the eastern part of Taylor county is found a twelve foot bed of the finest kind of fire clay. It has not been worked but tests made of the clay show it to be the equal of any fire clay known. There are two varieties, one suitable for paving brick, the other for finer work. All over the county good fire clay is found, being similar in the west to that of Marion county. It is safe to say that in no county in the State is there clay of superior excellence or in greater quantity than in Taylor county and when that time arrives when West Virginia's production of clay products shall equal that of New Jersey, then Taylor county will be found producing as much as any county in the State.

OIL AND GAS.—No oil has ever been found in Taylor county. The Marion county oil field does not extend into this county, or at least has never been found. There is, though, considerable natural gas which bubbles up from beneath the earth in several parts of the county. It is not improbable that future developments may show that there is oil in Taylor county.

TIMBER.—Taylor county has been settled a long time, has had railroad facilities and river transportation for logs, and its most valuable timber has been cut out. Not over a fifth of the county remains in timber, which is principally oaks, poplar, walnut, chestnut, hickory, etc. Grafton was at one time the market for all the timber from the Buckhannon and Valley rivers, which was floated down and caught in the boom above Grafton, but the railroads now control most of this business. The timber is sawed where it is cut and the railroads carry it out.

AGRICULTURAL.—The soil of Taylor county is all fertile, hills and valleys alike. Corn is the principal grain raised. Other grains are not grown to any great extent, but grass covers a large part of the county. The western and northern portions border along the grazing lands of Harrison and Marion counties, and the county is in the blue grass belt. For grazing Taylor county is about the equal of any county in the State. The western half, particularly, is fine grazing territory and good stock is raised. Cattle and sheep are raised and there is almost no waste land, hills and valleys all making good pasture. The county is well suited for fruit, which grows well.

TUCKER COUNTY.

LOCATION AND CHARACTER.—The boundary line between West Virginia and Maryland follows the Potomac river to its source and runs thence due north to the Pennsylvania line. The source of the Potomac, as ascertained and marked by Lord Fairfax is at the point where the town of Fairfax now is in Tucker county. An extension of the north and south line through the county would divide it into almost equal parts. Tucker lies at the west base of the main Alleghany range of mountains, and is one of the counties connecting the main part of the State with the narrow strip of counties east of the mountains. From south to north through the county flows the Cheat river, a tributary of the Monongahela. The eastern part of the county is watered by the Blackwater river, a stream whose waters are always black, and which with several other tributaries from the south flows into the Cheat in this county. None of the streams are navigable, but afford the means of getting out timber. The county is very mountainous and high but is not much broken except along the rivers. A good deal of the surface is high table land. Through the county in a northeast and southwest direction runs the West Virginia Central and Pittsburg railroad, making connections northward for the east and running up into Randolph county, thence down the Tygart's Valley to a connection with the Baltimore and Ohio branch road in Barbour county. St. George, the county seat, is about 6 miles from the railroad by which the distance to Martinsburg is 169 miles, to Baltimore 283, to Wheeling 182, to Parkersburg 186, to Charleston 320, to Cincinnati 381, to Chicago 649.

COAL.—About one-half of the county is well supplied with coal, the principal veins being the Upper and Lower Kittaning coal of the Lower measures. At several places in the county the coal is mined and since railroad communication has been established the production of coal and coke along its line has increased tremendously. There are two good veins of coal in the county, one about 9 feet and the other 6½ feet in thickness, excluding slate. Both are excellent coking coals, analyses of the coke made showing it to be among the best produced in the United States. For smithing the coal of Tucker county is unexcelled. The reports of the State Mine Inspectors show that in the year ending June 30, 1891, there were four mines, employing 335 men and producing 189,050 tons of coal, and 230 coke ovens producing 69,162 tons of coke. For the year ending June 30, 1892, the number of mines was 6, employes 690, coal production 396,320 tons, coke ovens 423, coke production 72,298 tons.

STONE.—Large quantities of good building stone are found in the county, both lime and sand-stone. There is no iron in the county.

TIMBER.—Over a third of Tucker county is still covered with valuable timber. This comprises cherry, oak, maple, poplar, spruce and hemlock. The two latter have suffered from the ravages of the pine destroying insect, but still offer thousands of acres of valuable timber. A great deal is being done to bring the timber of Tucker county to market, and the activity is very marked, particularly since the completion of the railroad. Saw mills are placed on every creek, and at very short distances along the railroad, and planing and wood working mills of every description are following. Large crews of men fill immense lumber camps in the forests, and are fast stripping the county of all its valuable timber. There is, however, a considerable portion of it that is untouched yet. The forests are very thick and the timber growth is large. An undergrowth of laurel grows among the trees, higher than a man's head, and so thick that crews of "swampers" have to be sent out ahead of the loggers to clear passage-ways so they can fell the timber.

AGRICULTURAL.—There is very little farming of any kind done in Tucker county, the work in timber and coal taking the place of that on the farm. Much of the land, though, is well adapted to farming. Cereals grow well, corn being the principal one raised. Grasses form

the most important crop of the county, and grazing the principal line of agriculture. Cattle of excellent quality and large size are raised, and no region of the State raises better cattle than can the region of which Tucker is a part. The county is especially adapted to sheep raising. There is hardly any part of the county that will not produce good grass, and sheep in this county do well and prove profitable. The county is also suited for fruits.

TYLER COUNTY.

LOCATION AND CHARACTER.—Tyler county is one of the counties lying in the Ohio valley. It is the second county south of the northern panhandle and borders along the Ohio river for about 15 miles. Through the center of the county flows Middle Island creek, which with its tributary streams waters well the whole county, emptying into the Ohio in the adjoining county of Pleasants. This stream is navigable for small flat boats in favorable seasons, while the Ohio river which follows the western boundary of the county is navigable for the largest steamers, except in occasional seasons of low water. The county is mostly rolling and hilly. The Ohio river bottoms are broad and level and the valleys of the smaller streams are also broad. The hills are not high or steep and most of them are well suited for cultivation. The soil in the valleys and on the hills is alike good and productive. The only railroad in the county is the Ohio River road, which follows along the western border for the entire length of the county. Middlebourne, the county seat, is off the railroad about 10 miles, the nearest point being Sistersville, by way of which the distance from Middlebourne to Wheeling is 57 miles, to Parkersburg 37, to Charleston 171, to Cincinnati 232, to Chicago 524 miles.

COAL.—The county is situated in the Upper coal measures, and the Pittsburg vein, the most important one in the measures, is found, with its excellent coking coals. The vein which is worked in Harrison county near the Tyler county line, and which is there above the water level, is found in Tyler from 50 to 350 feet below the surface of the earth, being deeper toward the western part of the county. The vein is from 8 to 10 feet in thickness and contains excellent coal. None of it has ever been mined in Tyler county, it

being easier to bring the coal in by rail from other places than to shaft for it here.

OIL.—In Tyler county is located the last large producing oil field discovered in the State, and which is now the best one of them all. It is known as the Sistersville field, from the town of Sistersville, which is right in the midst of it. No place in the field is held sacred and on every available lot a well or two has been put down. One is in a church-yard, while others are in private yards so close to the homes of residents that the great walking beams almost scrape the houses as they move up and down. The first well shot in this field was in February, 1891. It pumped nothing but salt water for four months and was then abandoned. About a year afterward pumping was renewed and the well showed oil It is now the best well in the field, pumping about 300 barrels of oil a day. The field was actively opened in February, 1892, and at the first of the present year there were 225 producing wells, 50 more being drilled, and 30 riggings going up. The total production of the field at that time was about 15,000 barrels a day. The pumps bring up both oil and water, about five times as much water as oil, but the production given above is in oil, exclusive of the water. The field is oval in shape, the oil pool clearly defined, its greatest width being about two miles, its length about five miles. The distance to the oil sand at water level is about 1,400 feet. The sand is 250 feet thick, the first 50 feet producing oil. There have been very few dry holes in the field, most of the wells drilled in proving to be good producers Along with the oil there is plenty of natural gas, and this is piped for many miles to all the cities and large towns in reach, where it is used for fuel and lighting purposes.

IRON.—Some iron ores are found in this county, but no investigation of their value or extent has ever been made. The ores are brown hematite and nodular ores, some of them thought to be very rich, and the deposits are quite large.

STONE.—Limestone for building purposes and an excellent hard sandstone are found in the county and used locally for building.

CLAYS.—Fire clays and ordinary brick clay are found in several parts of the county and are thought to be in valuable deposits. The location is good for clay working establishments of all kinds and the clay is as good as any that is found along the Ohio river.

TIMBER.—Not over two thirds of Tyler county has been cleared, the rest remaining in timber. Oak, poplar, hickory, chestnut, ash and walnut are the principal woods, though there is very little of the latter left now. The lands along the streams have all been pretty well cleared, but on the lands back from them and on the hills little has been cut. The waters which penetrate the county are large enough to carry timber out on rises, and afford easy means of getting it tc market. A great deal is worked up in the county. Saw mills, stave mills and other wood working industries are numerous in the county and the forests are rapidly disappearing.

AGRICULTURAL.—The soil of Tyler county is fertile and productive the surface level in the valleys and sloping gently on the hills, so there is hardly any portion of the county that is not suited for cultivation. The Ohio river bottoms are very productive, the valleys of the smaller streams are also rich and the hill lands are admirably adapted to some lines of agriculture Grains of all kinds grow well, fruits are good and productive and grasses make excellent sod. Cattle are raised in goodly numbers and sheep also do well.

UPSHUR COUNTY.

LOCATION AND CHARACTER.—Near the center of the State, but slightly to the north-east of it, is Upshur county. The southern portion of the county is in the high region which divides the waters of the northern part of the State from those of the southern, and the entire county is high and portions of it mountainous. Through the centre of the county the Buckhannon river flows northward, passing into Barbour county, where it flows into the Tygart's Valley river. Along a portion of the eastern boundary flows the Middle Fork of the Tygart's Valley river, and in the southern portion of the county is the Little Kanawha river. These streams are all small in Upshur and none of them navigable, but with their tributaries abundantly supply the county with water. The county, though partly mountainous, is not much broken, the mountains are not steep, and the surface, while mostly high, is level and rolling. Buckhannon, the county seat, is located on a high level along the Buckhannon river, near the center of the county. From it two branches of the West Virginia and Pittsburg railroad run through the county—one southward into the magnificent forests in the upper

end of the county, the other westward to the main branch of the same road at Weston. By way of this road the distance from Buckhannon to Parkersburg is 123 miles, to Martinsburg 243, to Baltimore 357, to Wheeling 152, to Cincinnati 318, and to Chicago 619 miles. When the railroad up Elk river from Charleston is completed, the distance to Charleston will be 160 miles A short railroad from Buckhannon to a connection with the B. & O. in Barbour county is contemplated but not begun.

COAL.—There is a good deal of coal in the county, Upshur having the same two seams that Barbour county has—the Pittsburg, with an average thickness of about six feet, and the Roaring Creek coal, which is in several veins of varying thickness, running up to ten feet, and is in all respects similar to the coals of the same seam in Barbour county. There is a coal found in Upshur—found in "pockets"—covering perhaps 8,000 acres of the county so far as now known, which is a splendid blacksmith coal, has very little sulphur, —less than one per cent.,—and is used in forges without coking. It is a superior smithing coal, much sought for by those who know it, and is similar to a coal valued highly for this purpose which is said to be found in but two other localities. Notwithstanding the quantity of coal that is hidden away in Upshur county, none has ever been mined, save in a few places for local use.

IRON —Upshur has a little iron ore, but hardly in workable quantities.

CLAY AND STONE —Fire clay, which has been tested and pronounced very fine, is found widely distributed throughout the county. The depth of the bed is not known, but it has been dug into for 10 feet, and the bottom of the bed was not then reached. The clay is of excellent quality and in enormous quantities, and will undoubtedly bring the county into prominence as a center for clay manufacturing at no distant day.

Building stone, both lime and sand, is found in the county. The limestone is not found over a large extent, being only in a portion of the county, but there is an abundance of fine sandstone for building purposes.

TIMBER.—About one half of Upshur county is still covered with timber, which is being rapidly taken out. In this county is found some of the finest timber in the State, and hitherto it has been

comparatively neglected so that now, upon the completion of the railroad into the forests, the timber is being rapidly removed. One firm alone in the southern end of the county employs over 500 men in getting out and sawing up the timber. There are in the southern part of the county numerous coves between the mountains where the many streams which have their sources in or near this county rise. These coves are rich in soil and well protected, high and dry, so the conditions are most favorable for excellent timber. There was once fine walnut in the county but most of it has been taken out. Poplar, oaks, spruce, pine, hemlock, ash and cherry are the principal timbers standing, and some of the finest specimens in the State are found here.

AGRICULTURAL.— Farming and grazing are the chief interests of the county. The soil, not so fertile as some, averages very well. The mountains are not steep, and every foot of ground in the county is available for agricultural pursuits. Blue grass springs up when the land is cleared and forms an excellent grazing country. Horses and cattle were formerly raised in great numbers, but the decreased prices for stock discouraged the people and fewer horses and cattle are raised. Sheep, though, are grown to a considerable extent, and the county is well suited to them. Farming of all kinds may be successfully carried on, though grazing is its favorite form among the present occupants of the county. Fruit raising proves profitable and the county is well adapted to its culture. It is high—Buckhannon, about the average, is 1,200 feet—and dry, and fruits are well protected. Grapes and apples do particularly well.

WAYNE COUNTY.

LOCATION AND CHARACTER.—Wayne county is the westernmost one in the State. It forms the western corner where the States of West Virginia, Kentucky and Ohio join. Along the northern end of the county flows the Ohio river. The western boundary is the Big Sandy river and the Tug Fork of the same, which separate this State from Kentucky. Through the county from south to north flow the Right and Left Forks of Twelve Pole river, which unite at Wayne Court House. The Ohio is nearly always navigable for large steamers. The Big Sandy is part of the time navigable even above Wayne county. Along the Ohio shore through the entire

county run the Chesapeake and Ohio railroad, which connects Cincinnati and Chicago with the seaboard, the Newport News and Mississippi Valley railroad, connecting central Kentucky with the C. & O., the Ohio River railroad, connecting Wayne county with Wheeling and intermediate points, and the Huntington and Big Sandy railroad, running from the mouth of Big Sandy to Huntington. Through the length of the county, north and south, runs the Norfolk and Western railroad, connecting Chicago with the seaboard. Wayne, the county seat, is on the N. & W. railroad, 21 miles from the Ohio river, 30 from Huntington, 80 from Charleston, 224 from Wheeling, 173 from Cincinnati, 552 from Norfolk, and 478 from Chicago. The county is hilly, bordering on the mountainous in places. The Ohio river bottoms are broad and there is much other good level bottom land in the county. The hills slope gently and none of them are steep. The county is practically undeveloped except along the rivers and railroads. These portions have been pretty well settled and occupied, the rest remaining in its original state.

COAL.—Five miles above the Court House, on the left fork of Twelve Pole, coal is found, while on the right fork the first is seen 13 miles above. From these points up, along both branches, the coal is very abundant. The southeastern half of the county is thus plentifully underlaid with coal, while the rest of the county has none. In the upper part of the county the coal is very fine and can be found almost anywhere, and of almost any kind. In the western part the coal runs out over the hill tops or dips low under the Big Sandy to reappear in Kentucky, as at Peach Orchard. The coal of Wayne ranges from 2 to 11 feet in thickness, though from 5 to 6 feet are average veins. Veins of from 4 to 6 feet are more easily worked than are thicker ones because they have usually no partings of slate, and because less timber is required to prop up the top. Several kinds of coal are found in this county, including an excellent article of coking coal which has been tested and produces a splendid coke. There is also a good splint coal which contains little sulphur, is hard and excellent for shipping. Wayne has also a good deal of cannel coal which reaches in places a thickness of 4 feet. Wayne's coal is practically untouched. Until the construction of the N. & W. railroad none of it had been mined at

all except for local use, and even now there are but four or five mines along the line in Wayne. One 7 foot vein of coal is underlaid with a 6 foot vein of fire-clay.

CLAYS.—Excellent beds of fire clays are found in various parts of the county. The clay is of superior quality, and sample bricks made from it surpass in hardness, firmness and capacity for absorbing water some of the famous fire brick of the country. There is a great abundance of this fire clay and it is easy to get at. As mentioned above, a 6 foot vein of clay underlies a 7 foot vein of coal, so that the material and fuel for making brick and tiling may be mined at the same time. A valuable deposit of potter's clay is also found. but has not been worked.

OCHRE.—A fine deposit of yellow ochre, several feet thick, is found in the county, which has not been worked, but is valuable for making paint. There is a considerable quantity of ochre awaiting development.

IRON.—A good deal of iron ore is found all over the county and of several different kinds. The veins range from 18 to 72 inches in thickness, besides which "pockets" are found in several places. The ore found near the Court House is the same as that used in the furnaces at Ironton, Ohio, where its use has been markedly successful. Over on the Sandy side of the county is the thickest deposit of ore where it is 72 inches. Some of this iron is very rich, but it has never been developed at all, and its value is scarcely known. Wayne is one of the few counties in which the black band iron ore is found. This makes an excellent iron and is the material from which much of the celebrated Scotch pig is made. Limestone for fluxing is also found in the county near the iron and coking coal.

OIL AND GAS.—Natural gas is plentiful and escapes from the earth in many places in the county, while just across the line in Kentucky one of the largest gas wells in this part of the country is daily pouring forth its thousands of feet of valuable vapor. No oil has as yet been found in Wayne, though the prevalence of so much gas would indicate that oil might be found at no great distance.

SALT.—In boring for oil and gas salt water has been found in large quantities and in Kentucky near the State line salt has been made for market, but no attempt has ever been made in Wayne to make any salt.

TIMBER.—But a comparatively small portion of Wayne county has ever been developed at all, and it is estimated that three-fourths of the county is still in forests. Probably one-half of it is covered with untouched forests, the other fourth with only the very finest poplar taken off, leaving about three-fourths of the county covered yet with good timber. The land is all well watered and easy to take timber out of, but many large land owners have hitherto refused to let the timber be taken from their lands, and thus so much has been left. The timber comprises poplar, oak, ash, lynn, beech, birch, maple, a little walnut and some pine. Several saw mills are at work in the county cutting timber, but comparatively little is being taken out. Besides the saw timber there are vast quantities of timber suited for ties, telegraph poles and staves and other small timber. There is a good deal of hickory suitable for wagon and carriage works, and almost inexhaustible quantities of tanbark. The market value of the tanbark alone is more than equal to the assessment valuation of the entire county.

AGRICULTURAL.--Only the river bottoms and the sloping hills close to them have ever been farmed, and this principally in the northern part, but the entire county is suitable for farming, and as the timber is taken off it will gradually be brought under cultivation. The bottom lands are rich and yield good crops of grain. Corn in particular yields abundantly, in the best lands from 50 to 70 bushels an acre, and in some cases yields of 110 bushels are reported. One of the crops to which the land seems specially suited is tobacco The new land is the best adapted to it and excellent tobacco is grown in the county. Grass grows well and the hills and valleys where the timber is removed are covered with splendid pastures. Horses, cattle and sheep are raised and shipped in goodly numbers. Good cattle are raised and the county is suited in all respects to sheep raising, but the number of sheep is not so large as it should be. In this line as well as in the developing of the natural resources, there is room for the assistance of many more people than are now engaged in it.

WEBSTER COUNTY.

LOCATION AND CHARACTER.—Webster county lies slightly to the south-east of, but very close to the center of the State. It is all

high and principally mountainous. From east to west through the center of the county flows the Elk river Through the southern portion flows the Gauley, and for a short distance near the northern border flows the Little Kanawha river. Addison, the county seat, is at the junction of two forks of Elk, 1430 feet above the sea level and the surrounding mountains are from 800 to 1400 feet above that. South of Addison is the dividing ridge between the Elk and Gauley rivers, and across this ridge it is but three miles from the Elk to the Gauley, while the bed of the latter is 800 feet higher than that of the Elk at Addison. Hitherto distant from railroads and the higher civilization of the State, Webster has remained almost as it was when, away back in seventeen hundred and ninety odd, old Mr. Arthur, father of Rev. R. A. Arthur, of Addison, killed the last buffalo ever seen in this section of the country. Webster Springs, at Addison, was then a salt lick and the old buffalo trail over the mountain to it is still visible. Buffalo are extinct but other wild animals are numerous in the county. Frequently bears are seen; young cubs are caught every year and an occasional fight between bears and woodsmen is reported. One man has a couple of young native wolves and deer are slain every fall. Wild turkeys and other small game are plentiful. The northern part of the county is a high plateau but most of the county is very rough and the mountains are steep and broken In the southern portion of the county are "the glades" These are marshy table lands at an elevation of about 2,400 feet above sea level. They are probably the bottoms of some ancient sea, as shells and other evidences of marine life have been found there Imbedded in the earth ten feet below the surface a white pine log was found a few years ago. Where it came from is not known as there is now no pine or evidence of any within ten miles of the place where this was found The glades are absolutely level. The soil is black, has absorbed water until it is soft and mushy for ten feet deep and shakes, when disturbed, like a big bowl of jelly. Below the marshes is a whitish yellow clay which absorbs no water. There is no way for this water to run off and it remains and makes the marshes. There are some 30,000 acres of these glades which drainage would convert into excellent farming lands. The soil is rich and only needs drainage to become productive. Until within a year there has been no railroad in Webster county but in the year

past the Gauley extension of the West Virginia & Pittsburg has been completed through the county, south-west of the center from the main line in Braxton county to the Gauley river near the southern part of the county. Addison, the county seat, is 13 miles from this railroad, by which the distance to Wheeling is 220 miles, to Parkersburg 180, to Martinsburg 300, to Baltimore 414, to Cincinnati 375, to Chicago 680. The distance to Charleston is 65 miles over land, and 35 by rail. Upon the completion of the railroad up Elk river the distance by rail will be 140 miles.

COAL.—Webster county contains a great deal of coal, principally the New River coking coals, which are found in veins of from 2½ to 6 feet thick. Near the top of one of the mountains the excellent vein of coal operated by the Gauley Mountain Coal Company at Ansted, in Fayette county, crops out. Near Addison one vein of coal has been dug into for 9 feet without reaching bottom, but this was probably on a slant, and the actual thickness of the vein is not so much as this. Over in the glades are coal veins of 10 feet thickness with a parting 3 feet from the bottom. The lower part of the seam is good coal, the other a shale, rich in oil and giving out an intense heat when used with coal, but which will not burn alone. Few of the coal veins of Webster county have ever been discovered. It is known that the county lies among the New River coal measures, and some excellent openings of this coal have been made, but there are undoubtedly more veins which are not now known. The western part of the county lies in the Lower coal measures, which also produce most excellent coking coals. There are also known to be other coals below the bases of the mountains, but no investigations have ever been made as to their quality or extent. One vein recently discovered measures 12 feet in thickness and is supposed to underlie the entire county. Cannel coal of excellent quality is found in the western part of the county over a considerable area. While investigations have not been thoroughly made, it is known that Webster county possesses plenty of coal of the very best quality, in workable seams above the water level. Its development is a matter of but a short time.

IRON.—Some iron ore has been found in Webster county, but none as yet that would pay for mining. In Braxton, the adjoining

county, iron is found, and it is not at all improbable that it may be found in Webster.

FIRE-CLAY.—In many parts of the county good fire-clay has been found and bits of earthen ware are occasionally picked up among the relics of pre-historic races, showing that the value of the clay has long been known.

LEAD.—Tradition tells of silver and lead being found between Addison and Stroud's creek, which empties into the Gauley, and mined by the Indians. White slaves were sometimes taken by the Indians to the mines, but the few who knew their location died in the possession of the secret. At one place on Stroud's creek old pottery, supposed to be Indian crucibles, has been found, and it is supposed they were used to melt the ores in. At the mouth of Stroud's creek, after freshets, nuggets of lead as big as buckshot have been found. They have the appearance of being splashings or drippings from the melting pot, and it is said that this is the place the Indians took the ore to reduce it. An occasional search has been made for the lead mines, but has always been unsuccessful.

SALT.—The salt springs at Addison were discovered before the last buffalo was killed by Mr. Arthur a hundred years ago, when buffalo came across the mountains after salt. Later Mr. Arthur and others made a good deal of salt here for domestic use and sold some of it in neighboring counties. None is now made though the salt water still pours from the ground from several springs. Sulphur and other minerals are mixed with the salt in the water and make a highly recommended medicinal water which brings hundreds of people every year to test its virtue.

TIMBER —Nine-tenths of Webster county is still covered with virgin forest. For seventy-five miles above Addison 200,000 acres along the Elk and its tributaries are covered with untouched forests of oak, poplar, black spruce, ash, black birch, cherry and other varieties. The black spruce covers some 30,000 acres of land, and is interspersed with cherry which is in places very abundant. Near Addison a gentleman has a barn built entirely of cherry, showing the abundance in which it is to be found there. There is in the county considerable black birch which is a beautiful hard wood somewhat resembling cherry. On the Gauley side of the divide there are some 40,000 acres of untouched timber in Webster county

alone which are tributary to the new railroad town of Camden-on-the-Gauley. The timber of Webster is among the finest in the State, poplar trees measuring from 4 to 9 feet in diameter and from 40 to 80 feet in length. All the trees are of good size and the land is all well covered with this splendid timber. The timber is all easily accessible, growing as it does on the steep mountain sides, at the foot of each of which is a stream large enough after rains to float the timber cut from the mountains. Recently the cutting of timber has been begun and at one time last summer a single lumber firm had in Elk and its tributary streams in Webster county twenty million feet of timber, all cut and waiting for flood tide to be taken to the mill. At Camden-on-the-Gauley the largest saw mill in the State has been erected with a sawing capacity of 80,000 feet a day and the timber is beginning to be cut out pretty rapidly.

AGRICULTURAL.—With so much timber standing, of course there is very little of the county under cultivation. The soil is rich but little of it has been cleared. Along the rivers and roads are a few rough farms but only a few small clearings lie hid among the forests. The soil is very productive and grains of all kind do well. The very finest buckwheat is raised, and corn on the rich hill lands yields 25 to 50 bushels to the acre. The plateau lands in the northern part of the county will make splendid agricultural lands when cleared, but much of the county is so steep as to be practically unfit for farming. For grazing most of the county is available, and it has been carried on to some extent. Blue grass springs spontaneously from the soil as soon as the timber is removed. Excellent pasturage is afforded and cattle and sheep of the very best can be raised. The mountain mutton is very fine and many sheep are already raised.

WETZEL COUNTY.

LOCATION AND CHARACTER.—The first county south of the northern panhandle, bordering on both Pennsylvania and Ohio, is Wetzel. In the eastern part of the county rises the Big Fishing creek, a stream which traverses the county, flowing into the Ohio at New Martinsville, and with its tributaries waters the whole county. This stream affords the means of transporting to market a large amount of the timber of the county. Principally rolling, with

slight hills, the surface is broken in places with higher hills which occasionally assume considerable proportions and are quite steep. Much of the county, though, lies well and is not too steep for cultivation. Through the western part of the county, following the Ohio river for about fifteen miles, is the Ohio River railroad, connecting north and south with all the east and west lines which cross the State. Running through the north eastern part of the county for about the same distance is the main line of the Baltimore & Ohio railroad connecting the east and the west. New Martinsville, the county seat, is on the Ohio river and the railroad bearing that name. The distance from there to Wheeling is 39 miles, to Parkersburg 56, to Charleston 189, to Baltimore 409, to Cincinnati 251, to Chicago 505.

COAL.—In the eastern part of the county is a vein of coal above the water level, said to be 12 feet in thickness, and good coal. The coal has never been developed, but examinations show that there is good coal here in workable quantities, while under the entire county, from 200 to 300 feet below the surface, are found the other coals which underlie all the counties in this part of the State. None of them have ever been mined but their place has been found by borings for oil and other purposes.

STONE.—Good sandstone for building purposes is found well distributed over the entire county. There is also limestone in portions of the county suitable for building and agricultural purposes. The fine sand found in the Ohio river is abundant here and in the smaller streams of the county, and is valuable for building purposes.

OIL.—Situated near the rich producing oil territory of Marion, Monongalia, Doddridge and Tyler, almost surrounded by rich producing territory, it would seem that there should be plenty of oil beneath the surface of Wetzel county, but as yet the investigations have shown but little as compared with the territory of the adjoining counties. Some oil has been found and a good deal of gas but as yet the Wetzel field is not known as a good producer. Still a good deal of the land is bound up in oil leases and developments are being made, which may yet show that there is oil in the county.

TIMBER.—The county contains some valuable timber. Owing to the proximity of the county to the markets and the excellent water

transportation afforded in all parts of the county a great deal of the timber has been taken out, but about a third of the county is still in timber. The oaks are the principal kinds of timber left though there is still some poplar and other kinds that may be easily gotten out. Millions of feet come annually out of the Big Fishing creek, every rise in the stream bringing out a great many logs, ties and other forms of timber. There is some tanbark produced in the county.

AGRICULTURAL.—The county is well adapted to agriculture and is carefully cultivated. The greater part of the county is under cultivation, a large part of it being in grasses. The Ohio river bottoms and the valleys of the streams that traverse the county are the most fertile in the county and are all in a high state of cultivation, producing large crops every year. Some of the lands produce as much as 80 bushels of corn to the acre and keep it up constantly. The hill land is mostly cultivated also and the crops there are all satisfactory. Garden stuff is raised by many of the farmers in the county, the cities near at hand affording a good market for them. Fruits of all kinds yield well. The climate is sufficiently cool to make it a good one for apples, grapes, etc., and all kinds are raised in considerable quantities. Clovers, blue grass and other kinds of grasses grow in all parts of the county and make excellent pasturage. Cattle are raised, sheep grown for their wool and for mutton and stock raising is about the greatest industry of the county. The high and dry lands of the county, the fine grass and the abundance of pure, clear and rapidly running water in the county make it a good one for stock raising.

WIRT COUNTY.

LOCATION AND CHARACTER.—Northwest of the center of the State and about two-thirds of the way from there to the Ohio river is Wirt county. The Little Kanawha river, navigable for steamboats, flows in a north-westerly direction through the county, dividing it in almost equal parts. The Hughes river, Reedy and Spring creeks and the West Fork all empty into the Little Kanawha in this county. The county is principally rolling in character, with some hills but no steep ones. The valleys are in places broad and very fertile. The Little Kanawha river is improved with locks and

dams owned by a navigation company, and daily packets ply the river from the Ohio to a point in Calhoun county, and have occasionally been able to reach Glenville in Gilmer county. From Elizabeth, the county seat, to Parkersburg, where there is railroad connection, it is 26 miles by river. From Elizabeth to Wheeling is 120 miles, to Charleston 159, to Martinsburg 310, to Baltimore 324, to Cincinnati 221, and to Chicago 526 miles. There is no railroad in the county, but the Little Kanawha Valley railroad is projected to run from Parkersburg up the Little Kanawha. The towns along the entire length of this river are connected by telephone.

COAL.—Only small veins of coal are found above water level in Wirt county. From 18 to 30 inches is their thickness, and they are too small to make it profitable to work them Below the surface there is an abundance of excellent coal of the Lower measures. In boring for oil veins of from 8 to 10 feet in thickness have been found at a depth of from 60 to 100 feet below the surface of the earth. These veins are supposed to underlie the entire county, and it would be an easy matter to construct a shaft by means of which this coal might be readily mined. The quantity of coal contained in these hidden veins is almost inestimable, but it is beyond question that there is to be found beneath the surface of Wirt millions of tons of it, and the day will come when the out-put of coal from Wirt county will equal that of any other county in the State.

IRON.—Iron ores may be found in almost every part of Wirt county, and in veins from 7 to 11 feet in thickness. Analyses made of specimens selected at random from this county show them to contain from 50 to 64 per cent. of metallic iron. Railroad transportation would afford an opportunity to test this iron in a practical way.

OIL.—Wirt county was the scene of the earliest oil excitement in the State. Away back in 1861 Burning Springs was quite a town. Many of the now prominent people of the State were among those who made money then in oil, and Senator Camden, owner of so many West Virginia railroads, forests and coal fields, is said to have gotten his start on the road to fortune in this place in the days of the first oil excitement. There were no two and three thousand foot wells then; oil was found at 96 to 300 feet and in a short time the whole territory was punctured like a pepper box. On 800 acres

at Burning Springs there were at one time 300 wells. Then came the war, and in 1863 the Confederate General Jones set fire to the place and the entire field was swept by fire. In 1865 the excitement broke out anew, but it was not long till the oil gave out. There were no modern methods in vogue, the wells were not cased and when bored deep enough the water came in and they were "drowned out." But few remain productive and the town, consisting of half a dozen dilapidated houses, a few leaky gas pipes and scores of piles of old rusty machinery with an occasional walking beam, is now about as dead as it can be. A well bored recently to a depth of about 2,000 feet shows up well and promises to be productive of much oil. While some made their fortunes in oil, many lost and the entire value of all the oil taken out never equalled the amount of money sunk in the oil field. This early product was a magnificent oil, and brought from $5 to $8 per barrel, always commanding a little higher price than any other on the market. Refined oil and other products consumed 90 per cent. of the oil so that in the crude oil there was a waste of not over 10 per cent. In the early days the oil was barreled, the barre's rafted like logs and great rafts of oil were floated down to Parkersburg. Other fields have taken the place of this one now, but some oil is still produced and the deep wells will probably yield considerable oil when the field is tapped with them.

TIMBER.—Wirt has been pretty well stripped of its timber, very little of which remains, probably not over a tenth of the original amount. The county was once covered with splendid timber but its proximity to the Ohio river and railroads at the mouth of the Little Kanawha and the numerous streams through the county affording transportation for timber, have caused about all the timber there ever was to be taken out early, and while the Little Kanawha is filled with timber rafts most of the time, they come from the counties above and are cut into lumber in Wirt county or in Wood at the mouth of the river.

STONE AND CLAY.— Limestone is found in the county and a good sandstone for building purposes. A sandstone which is utilized for whetstones and grindstone purposes is also found in the county but its use has been quite limited.

Fire and potter's clays are found in considerable quantities but have never been developed.

AGRICULTURAL.—Wirt county is composed mainly of excellent agricultural lands and but for the fact that the soil has been neglected and timber and oil operations carried on instead of farming, it would now rank higher than it does in agriculture. The soil is rich, tne hills slope gently, the valleys are broad and crops produce well. Corn and the other cereals and tobacco are well adapted to the soil and yield well The county is an excellent one for grazing. Blue grass grows luxuriantly and spontaneously on many mountain sides and sheep and cattle are easily raised. Considerable attention is given to sheep and they do exceedingly well. Cattle and live stock are raised cheaply, living the greater part of the year on open pastures, and are close to railroads and thus near market. Particularly is Wirt a fine fruit county and some magnificent specimens are seen. Luscious blackberries and raspberries of excellent size and flavor grow wild along the road sides and apples, peaches and other fruits grow to enormous size. On "Limestone Hill," in the western part of the county, especially fine fruits are grown and the culture of orchards produces a considerable revenue to the people of the county every year.

WOOD COUNTY.

LOCATION AND CHARACTER.—Northwest from the center of the State, bordering on the Ohio river and about midway between the northern and western extremities of the State is the county of Wood. Along its entire western border flows the Ohio river, while through the center of the county in a northwest direction flows the Little Kanawha river, emptying its waters into the Ohio at Parkersburg, the county seat. Both are navigable the entire year for steamboats. Following the Ohio river the entire length of the county is the Ohio River railroad, which follows the entire western border of the State connecting Wheeling with Huntington. The Baltimore & Ohio railroad also passes through the county, giving direct communication with the east and the west. Parkersburg is 98 miles from Wheeling, 121 miles from Huntington, 135 from Charleston, 398 from Baltimore, 195 from Cincinnati, and 500 from Chicago. The county contains much of the fine Ohio river bot-

tom lands, the rest of the county being rolling and hilly. In the southern portion of the county the land reaches a greater height than anywhere else but is even there not mountainous. The climate is mild and healthful, the soil productive, the transportation facilities good.

COAL.—At Volcano, near the Ritchie county line, coal is mined for local use from a small vein under three feet in thickness. This is the only place in the county where any coal is found above the water level but beneath the surface the entire county is underlaid with good coal. At Parkersburg borings for oil showed a seven foot vein at a depth of 1,100 feet below the surface. East of the river the coal is not so deep and might be easily shafted for and mined.

OIL.—In and near Wood county was found the first oil ever produced in West Virginia and large quantities have been produced from this county. The Volcano field is the principal one and produces a fine quality of lubricating oil. It is a natural lubricating oil, very fine and requires no mixing or refining. While the field is small the value of the oil is so great as to make the field a valuable one. Vast quantities of the oil have been produced and it is still being produced from wells about 600 feet deep. Deeper wells have been sunk in the county but no other oil has yet been found, although the county is almost entirely surrounded by oil producing territory. Parkersburg has always been an oil market since the first discovery of petroleum and a large refinery has been in operation for many years.

CLAY.—Fire clay of excellent quality is found in large deposits, particularly in the oil region. The clay is very fine and it would pay well to work it except for the competition of towns along the river which have the advantage of cheap transportation and nearness to market. At Parkersburg a pottery has been in operation for years, using the fine potter's clay found in the vicinity and making as fine pottery ware as is made in the country. All that is made meets with a ready market and several times as much as is made might easily be made and disposed of at a good price. The business seems to be profitable and with plenty of the finest kind of clay and advantages for shipping there is no reason why the river valley portion of the county should not become a large clay working center.

STONE.—Just across the Ohio river from a portion of Wood county is the largest establishment for making grindstones in the United States and the same ledge of stone from which they are made extends into Wood county on the other side of the river. The stone has a national reputation and car loads of the stones are shipped daily. The quarries on the West Virginia side of the river have been controlled by lease by the company which is making the stones on the other side of the river and its development has been prevented by them. The lease is said to have expired and West Virginia will soon take a proper rank in the production of grindstones for the use of the nation. It is a fine stone and there is a good deal of it.

TIMBER.—With the timber of the county easy of access and two rivers flowing through the county the timber has been pretty well taken out. Perhaps a half of the county is still in timber, most of which is oak, poplar and similar kinds of wood. The bottom lands and all the best farming country has been cleared but some of the higher lands are still in timber.

AGRICULTURAL.—There is some very fine farming land in Wood county. The Ohio river bottoms, among the most fertile lands in the State, run for thirty-nine miles through the county, besides which a great deal of the county is well adapted to farming and grazing. Excellent crops are produced, grains and produce of all kinds yielding well. Back from the river on the higher lands grass grows abundantly, a portion of the soil being limestone soil and producing a heavy growth of fine blue grass. Fruits yield well and large orchards are kept in all the higher parts of the county. Some of the fruits, particularly the apples, are exceedingly fine. Considerable attention is paid to grape culture and some of the largest vineyards to be found in the State are grown in Wood county. Stock raising is largely engaged in and the Wood county stock farms contain some excellent stock. Horses are bred in considerable numbers and cattle and sheep are also largely raised.

PARKERSBURG is the third city in the State, with a population, as shown by the census of 1890, of 8,408, which has since then considerably increased. The increase from 1880 to 1890, was 27.74 per cent. It is a flourishing city of importance as a railroad, commercial, manufacturing and shipping point. Oil refineries, wood working establishments, foundries, machine shops, etc., com-

pose the manufactories, while a large part of the State is supplied with goods from Parkersburg wholesale houses. Both the B. & O. and the O. R. railroads have their shops here. The city has both natural and manufactured gas, electricity, water works, fire department, good sewerage, paved streets, street railway, handsome public buildings, stores and residences, four national banks, and a great deal of wealth is represented by its citizens.

WYOMING COUNTY.

LOCATION AND CHARACTER.—McDowell is the southernmost county in the State and Wyoming lies immediately north of it. The county is rough and mountainous throughout and is bordered by mountain ranges, the Guyandotte mountains on the north being among the highest in the State. Through the centre of the county for its entire length the Guyandotte river flows westward, several tributaries uniting their waters with the river in this county. Along the southwestern border for a short distance flows the Tug Fork of Big Sandy. Along the banks of the Tug is the Norfolk and Western railroad, which touches the edge of the county for a short distance. Oceana, the county seat, is on the Clear Fork of Guyandotte river some 15 miles from the N. & W railroad. Before the construction of this road the nearest railroad was the Chesapeake and Ohio, 52 miles from Oceana, from which all the supplies for the county were hauled over the mountains By the N. & W. the distance to Huntington is 184 miles, to Cincinnati 345, to Norfolk 416, to Wheeling 399, to Chicago 650 miles By the C. & O. the distance to Charleston is 126 miles.

COAL.—Wyoming is one of the most highly favored counties in the State in coal. In the eastern part of the county is the Flat Top coal, which dips under the earth and the Kanawha coals appear above it further toward the west. Over the central and western parts of the county ten veins of coal extend, some of them 5 and 6 feet and one is reported 14 feet in thickness. Every kind is found —cannel, coking, splint and steam. In fact every kind of coal found in the United States is found here except anthracite. No coal has ever been shipped. All that has been mined was for domestic use and very little has been consumed in that way. It is said that there is not a spot in the county a mile from a coal vein,

and every resident of the county may have his own coal vein, every land owner his fuel for the digging More than that—if he doesn't like one kind of coal all he has to do is to open another vein and try a different kind. The proposed branch of the N. & W. railroad up Twelve Pole and Guyandotte rivers would penetrate the finest of the Wyoming coal fields from end to end, as would also the proposed railroad up Coal river from its mouth near Charleston to a connection with the N. & W. This latter road could be constructed on an easy grade along the Big and Little Coal rivers to the Walnut Gap mountain which separates Boone from Wyoming and could be built under this mountain through an 11 foot coal vein and the coal taken out would pay for the tunnel. The coal vein is at water level on both sides of the mountain and the tunnel need not be over a mile or two long. Throughout Wyoming county, as in Boone and Logan, coal may be found along the roadsides almost anywhere. With some 50 or more feet of coal in every mountain, not a bushel of which has ever been taken out of the county, and almost every variety to select from, the enormous value of these immense deposits can scarcely be appreciated.

STONE.—Excellent sandstone for building purposes is found in this county in great abundance.

TIMBER. It is only within the last three years that any timber at all has been taken out of Wyoming county and even now there are from five-sixths to seven eighths of the county in the original forests. No timber in the State surpasses in excellence that of Wyoming county. A recent sale comprised all the timber on 50,000 acres, on which there were estimated to be 100,000 poplar trees above 22 inches in diameter and which would average 3 logs to the tree. Two good poplar trees to the acre is a good average. Estimates on oak give from 3½ to 6 trees to the acre besides the poplar and other varieties. The poplar logs will average from 4 to 5 feet in diameter. Walnut averages about the same though some trees grow to enormous size. Most of the walnut has disappeared, though in some parts, notably the western part, there is much of it left. Hickory, chestnut and other kinds of timber grow profusely and to enormous sizes. One enterprising firm, knowing the value of the timber of Wyoming, has quietly purchased a large amount of it and has begun a wholesale destruction of the forests, but it will

take years to cut them down and there is still much valuable timber available in the county.

AGRICULTURAL.—Unbroken as is the original forest, little opportunity has been offered for farming. The western part of the county is very rough and broken but there are portions that are suitable for cultivation. The valleys are productive and much of the land is rolling rather than mountainous. Corn is the principal crop grown, although the soil is adapted in places to tobacco. Cleared of the timber the hills would make good grazing lands, for grass grows well. Cattle and sheep are raised with little trouble and might be grown in greater abundance. Fruits would do well, though few are now raised.

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COUNTIES.	Area in square miles.	Population in 1880.	Population in 1890.
Barbour	395	11,870	12,702
Berkeley	320	17,380	18,702
Boone	515	5,824	6,885
Braxton	565	9,787	13,928
Brooke	84	6,013	6,660
Cabell	300	13,744	23,595
Calhoun	260	6,072	8,155
Clay	325	3,460	4,659
Doddridge	475	10,552	12,183
Fayette	750	11,560	20,542
Gilmer	330	7,108	9,746
Grant	490	5,542	6,802
Greenbrier	1,050	15,060	18,034
Hampshire	550	10,366	11,419
Hancock	92	4,882	6,414
Hardy	400	6,794	7,567
Harrison	464	20,181	21,919
Jackson	470	16,312	19,021
Jefferson	280	15,005	15,553
Kanawha	895	32,466	42,756
Lewis	400	13,269	15,895
Lincoln	460	8,739	11,246
Logan	675	7,329	11,101
Marion	314	17,198	20,721
Marshall	248	18,840	20,735
Mason	440	22,293	22,863
Mercer	420	7,467	16,002
Mineral	370	8,630	12,085
Monongalia	325	14,985	15,705
Monroe	460	11,501	12,429
Morgan	230	5,777	6,744
McDowell	680	3,074	7,300
Nicholas	720	7,223	9,309
Ohio	120	37,457	41,557
Pendleton	650	8,022	8,711
Pleasants	150	6,256	7,539
Pocahontas	765	5,591	6,814
Preston	709	19,091	20,355
Putnam	350	11,375	14,342
Raleigh	570	7,367	9,597
Randolph	1,175	8,102	11,633
Ritchie	512	13,474	16,621
Roane	470	12,184	15,303
Summers	400	9,033	13,117
Taylor	177	11,455	12,147
Tucker	500	3,151	6,459
Tyler	330	11,073	11,962
Upshur	350	10,249	12,714
Wayne	445	14,739	18,652
Webster	415	3,207	4,783
Wetzel	550	13,896	16,841
Wirt	290	7,104	9,111
Wood	375	25,006	28,612
Wyoming	660	4,322	6,247
Total	24,645	618,457	762,794

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